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Effects of Acute Exposure To Methyl Isothiocyanate (MITC)

Prepared for:

AMVAC

Prepared by:

Michael L. Dourson, Ph.D.
Melissa J. Kohrman, B.A.
Toxicology ExcellenceFor Risk Assessment (*TERA*)
and
William S. Cain, Ph.D.
University of California, San Diego

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ABSTRACT

Toxicology Excellence for Risk Assessment (*TERA*) has evaluated the potential risk of exposure to airborne methyl isothiocyanate (MITC) to bystanders near treated agricultural fields. At concentrations of environmental relevance, MITC most likely acts via stimulation of the trigeminal nerve, which mediates sensory irritation in the eyes and nose. The outcome of a clinical study by Russell and Rush (1996), namely, perceived irritation, tearing, and blinking of the eyes, was consistent with this proposed mode of action. More severe effects, such as reduction in visual acuity and structural changes, which might occur via non-trigeminal nerve mechanisms, did not occur.

The animal data (rats) support this proposed mode of action. Jackson et al. (1981) and BASF (1987) showed clear differences in the latencies of effects from eye to nose to lung. Databases and studies by the California Department of Pesticide Regulation (CDPR) show that, in accidental exposures, the human eye irritation was consistently the most sensitive endpoint at low-modeled acute exposure, and most often the sensitive organ from exposures of unknown, but likely higher, concentrations.

Using IPCS (2005) and EPA (2002) guidelines, *TERA* determined that additional uncertainty factors are not needed for deficiencies in the database or for sensitive individuals, and, thus, an uncertainty factor of 1 is appropriate. Based upon benchmark concentration lower limits from the Russell and Rush (1996) human study, *TERA* has estimated health-protective concentrations of MITC to be 0.2 ppm for 4 hours of exposure and 0.8 ppm for 14-minutes of exposure.

1.0 INTRODUCTION

1.1 Reason for This Assessment

Certain fumigants, such as metam-sodium, metam-potassium, and dazomet undergo rapid decomposition to the biocide methyl isothiocyanate (MITC) in moist soils (see Figure 1). MITC may leave the treated soil as airborne vapors and cause symptoms of itchy and burning eyes, rashes, headache, nausea, throat irritation, salivation, coughing, and shortness of breath. These symptoms suggest that MITC acts directly at the point of contact and portal of entry. The vapors of MITC may affect field workers and pesticide handlers, and bystanders near treated areas.

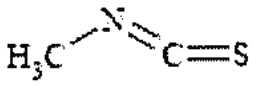

Figure 1. The chemical structure of MITC

Widespread use of fumigants like metam-sodium in pesticidal applications creates an increasing need for adequate assessment of their effects on human health. People near treated fields have a risk principally of acute exposure.

1.2 Prior Assessments

TERA (2007) used results of feelings of eye irritation, tearing, and blinking from a human study by Russell and Rush (1996) to determine a safe concentration of 0.2 ppm for a four-hour exposure to MITC. The concentration was based on a benchmark concentration lower limit (BMCL) of 0.2 ppm, when the benchmark response (BMR) is 10% ($BMCL_{10}$). *TERA* determined that the best estimate of a health protective concentration for a 14-minute exposure to MITC equaled 0.8 ppm, based on BMCLs of either 0.83 or 0.78 ppm for a 14-minute trial. *TERA* determined that an uncertainty factor (UF) of 1 was appropriate for both health protective concentrations because the Russell and Rush study included sensitive individuals and because *TERA* chose a conservative BMCL as its point of departure (POD).

The U.S. EPA has asked for further evidence that eye irritation forms the critical effect, and for additional support for the choice of the 1-fold UF. *TERA* (2008) has reviewed additional documents and studies to find information on irritation and other effects of MITC. Relevant information has been found in human incident reports and in studies that tested effects from acute inhalation in experimental animals.

TERA, in their supplemental report to the EPA (2008), reaffirmed eye irritation as the critical effect after short-term exposures. The trigeminal nerve mediates eye irritation and reflexes, such as tearing and blinking. A neural, as opposed to an inflammatory, mechanism for the ocular effects of MITC, is consistent with the rapid reversal of the effects of stimulation after cessation of exposure. Visual acuity and structural changes in the eye, possibly indicative of extraneural mechanisms, were evaluated in the Russell and Rush (1996) study, but there were no observed effects associated with exposure. The review of all the available information, including the new

information reviewed, even more strongly supports *TERA* (2008)'s conclusion that an UF of 1 is appropriate for both database deficiencies and sensitive individuals.

The EPA (2008a) Office of Pesticide Programs (OPP) also used the Russell and Rush (1996) study to develop a target concentration for MITC in buffer zones around agricultural fields. Based on a no observed adverse effect level (NOAEL) of 220 ppb, OPP calculated a safe concentration of "a maximum 22 ppb" for one to eight hours of exposure for this target concentration. The estimate included an UF of 1 for interspecies variability since the NOAEL came from a human clinical study. The estimate also included an UF of 10 for intraspecies variability to account for reports of systemic or respiratory effects in data from the California Pesticide Illness Surveillance Program data.

In addition to their risk assessment, OPP used an approach that incorporated the Probabilistic Exposure and Risk model for Fumigants (PERFUM), margins of exposure (MOEs), predetermined buffer distances, varied percentiles of exposure, monitoring studies, incident data, and other mitigation models to manage potential MITC risks to bystanders. OPP (EPA 2008a) focused on an MOE of 10 (upper percentiles) but stated: "The Agency selected the buffer zone distances for metam-sodium/metam-potassium, such that the resulting MOEs are ≥3 for all application methods and all weather stations data. While this does not meet the target air concentration for the buffer zone distances, even at the lowest MOE (MOE of 3), the predicted air concentration at the edge of the buffer would be 12 times lower than the lowest observable adverse effect level (LOAEL), which is the level at which eye irritation effects begin in humans."

In its proposed Acute Exposure Guideline Level (AEGL) for exposures to MITC the EPA National Advisory Committee (NAC) proposed an AEGL-1 of 0.8 ppm (800 ppb) (EPA, 2008b). This AEGL-1 was considered by EPA (2008b) to be relevant for exposures from 10 minutes to eight hours. The AEGL-1 is defined as a concentration that nominally protects the general population, including sensitive individuals, from discomfort, irritation, or other asymptomatic, non-sensory effects which must be non-disabling and reversible; this value is comparable with the risk assessments that *TERA* (2008) and the OPP (EPA, 2008a) have completed, because the latter two evaluations also focus on effects of minimal severity that are reversible and are for similar durations.

The NAC also used the data from Russell and Rush (1996). It chose 800 ppb based upon a LOEL for slight, transient, subjective irritation. It also defined 800 ppb as a NOAEL. The NAC applied an UF of 1 for interspecies variability. It applied an intraspecies UF of 1 as well. It considered that factor sufficient to account for the response of the sensitive population to a direct-acting irritant.

1.3 MITC and Sensory Stimulation

In recent years, receptor biologists have explored the question of why certain naturally occurring chemicals in plants have unusual ability to trigger chemesthetic sensations, principally pungency. Various compounds, quite notably capsaicin, the active material in chili pepper, and related pungent capsicum compounds, discourage predation of the plants that contain them. By the same token, potential predators can possess receptors on somesthetic nerves that register very small amounts of the compounds. A single bite of a pepper would reveal its aversive character, though curiously not its harm, for capsaicin causes almost none.

A very recent example illustrates how the simultaneous presence of an aversive chemical, in this case nicotine, and attractive compounds in the same plant may serve more than just protection against predation: "The desert tobacco N. attentuata lures hummingbirds (Archilochus alexandri) with sweet nectar flavors but sends them away with nicotine. This strategy allows them to both attract pollinators and move their pollen between plants" (Raguso, 2008). This "pull" and "push" strategy may enhance reproductive fitness for the plant.

The naturally occurring isothiocyanates most famously those in mustard oil – found for instance in wasabi and horseradish - seem to play roles in protection from predation as well. These materials, including MITC, an active ingredient in capers (El-Ghorab, et al., 2007), stimulate pungency via a somewhat different mechanism than capsaicin (Jordt et al., 2004; Peterlin et al., 2007). Nevertheless, the mechanisms have enough in common that research on the understanding of capsaicin greatly facilitated research on electrophilic agents to which the isothiocyanates belong. Both types of chemicals initiate their chemesthetic effects through members of the large TRP family of receptors, capsicum compounds through TRPV1 receptors and the isothiocyanates through the TRPA1 receptors (Story, 2006). (One could use the term channels here instead of receptors, but usage seems to be drifting toward receptors.) These receptors, found in tissues throughout the body, perform as chemesthetic transducers in somesthetic nerves, such as the trigeminal nerve (cranial nerve 5). The TRPA1 receptor adds diversity to chemical sensing because if affords more than one site and mechanism to perform its ultimately simple function, gating the flow of cations across a membrane.

Stimulation of the trigeminal nerve occurs with every touch to the face, eyes, nasal passages, and mouth, every change in temperature of the skin, and the presence of many airborne chemicals. In most instances (e.g., the vapors of solvents), the nerve responds to chemicals at high concentrations, far above the odor threshold, but in some instances responds to concentrations below 1 ppm and below the odor threshold. MITC stimulates at low levels, though its threshold lies orders of magnitude above that of other electrophiles, such as the tear gases CS and CR.

Small-diameter fibers, viz., c-fibers and a-delta fibers, of the trigeminal and related somethetic nerves are often called polymodal nociceptors because they carry information about events that may signal danger irrespective of the source, a blow to the face, rapidly rising temperature, or a chemical threat. Such a fiber may carry information about capsicum compounds and isothiocyanates, each class mediated through its own receptors in the fiber. Hence, the fiber, with its variety of mechanisms to register noxious events, serves as the guardian against just about all threats.

An electrophile can do more than stimulate somesthetic nerves. It can damage tissue in a concentration- and time-dependent manner. The structure-activity relationship for damage need

not coincide exactly with the relationship for stimulation of the polymodal nociceptors, but will likely show some correspondence. Accordingly, an agent that causes eye irritation before it causes nasal irritation will more likely damage the eye before it damages nasal mucosa. This kind of correspondence figures in the toxicological findings reviewed below.

The threshold for sensory detection and that for damage may differ by orders of magnitude. Before conditions reach damaging levels of severity, endogenous nucleophiles, such as glutathione, may attack the electrophilic site on a molecule to neutralize it (Ganea & Harding, 2006). Whether this action plays any role in the strong time-dependence of the effects of electrophiles remains largely unexplored. Nevertheless, the temporal property confers advantages; the unfolding of consequences over time affords incentive to disengage from contact before damage occurs. In this respect, the chemesthetic event differs considerably from, say, a blow to the head, which happens in an instant.

2.0 METHODS

2.1 Chemical Specific Adjustment Factors (CSAFs)

The International Programme on Chemical Safety (IPCS) has recommended use of Chemical Specific Adjustment Factors (CSAFs) to replace the default 10-fold UFs for interspecies or intraspecies differences. The approach divides uncertainty into weighted subfactors for toxicodynamic and toxicokinetic information and values them accordingly (see Figure 2). The CSAF can range below 1.0 to greater than the default subfactor, with the result called the Composite Uncertainty Factor (CUF). When the CUF lies below the default for the critical effect, then the guidelines call for examination of these subfactors for endpoints other than the critical effect.

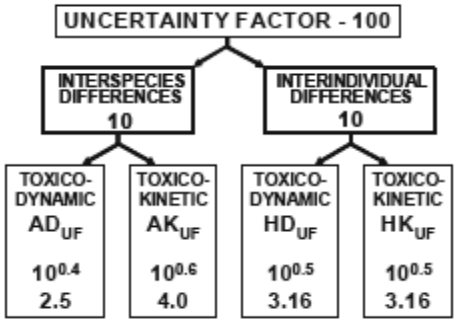

Figure S-1. Subdivision of the usual uncertainty factor of 100 used in setting guidance values for the exposure of the general population, such as ADIs, TDIs or RfDs. Different numerical values could be derived if the usual total default uncertainty factor were not 100 — for example, in the risk assessment of occupational exposures (based on IPCS, 1994).

Figure 2. The IPCS (2005) framework for Chemical Specific Adjustment Factors (CSAFs)

In the IPCS framework, an intraspecies, or interindividual, factor of 1.0 will often serve for sensory irritation, indicative of kinetic variability, i.e., variability in the tissue dose of the active form of the chemical from direct contact. An intraspecies factor of 3.16, the default value, may then validate that the dynamic variability is relevant. The IPCS (2005) framework has support in general principles of EPA guidance for inhalation Reference Concentration (RfC) (EPA, 1994), and in standard operating procedures to develop AEGLs (NRC, 2001). EPA guidance on a conceptually similar approach, termed Data-Derived Extrapolation Factors (DDEFs) should be released soon. For MITC, as an eye irritant, this approach could support a CSAF below 10, but would trigger consideration of other toxic endpoints such as irritation-mediated effects on the lungs.

The OPP Reregistration Eligibility Document (RED) used the IPCS framework in its consideration of chloropicrin. The draft RED for MITC (EPA, 2008a) also used aspects of the framework regarding eye irritation as the critical effect. *TERA* will use the framework as well.

2.2 BMC and ten Berge Modeling

As explained further below, *TERA* applied concentration-time-response methods, including benchmark concentrations (BMCs) and UFs (EPA, 2000a,b, 2002; IPCS, 2005) to eye irritation data from the Russell and Rush (1996) study. The analysis accounted for both exposure level and duration to predict the probability of a response (Zwart et al., 1990, 1992).

The analysis used the following general model to represent relationships among concentration (c) and time of exposure (t) and response (P(c,t))[1]

$$P(c,t) = g(b_0 + b_1*f_1(c) + b_2*f_2(t)),$$

The function g() transforms the linear relationship, which is its argument, to a probability beween 0 and 1 via a suitable function. The modeling examined both logistic and probit functions:

Logistic: $g(z) = \exp(z) / (1 + \exp(z))$
Probit: $g(z) = \Phi(z-5)$,

with z the standard deviate score, and $\Phi()$ the function for the cumulative standard normal distribution.

The modeling also considered linear and logarithmic transformations for the functions f():

$f_i(u) =$ u (identity transformation)
$f_i(u) =$ ln(u) (logarithmic transformation).

[1]According to the Zwart et al. (1990, 1992) approach, models with additional terms, representing other possible explanatory variables or interactions of the c and t terms are sometimes fit when needed. No other explanatory variables are proposed here. And, as shown below, no interaction terms are needed to obtain a good fitting model.

All four combinations of g() and f() were considered for predictive value.

An algorithm developed by ten Berge (2007), available as freely downloadable software, served to estimate the parameters (b_0, b_1, b_2) to describe the relative contributions of concentration and time, and to calculate BMCs.

The ten Berge program calculates confidence limits by the Wald method (Fieller, 1944), shown to produce errors (Crump and Howe, 1985).[2] To circumvent the problem, *TERA* chose an alternative that computed well-behaved limits for BMCs computed at specific durations. EPA software, BMDS version 1.4.1, served the purpose, with BMCL estimates (benchmark concentration lower bounds) defined as the 95% lower bounds on the BMC, corresponding to 10% extra risk.

2.3 Russell and Rush (1996)

In an Institutional Review Board (IRB)-approved study, Russell and Rush (1996) tested 70 human volunteers, whose population included both sexes of different ages with various health conditions. Many of these humans were between the ages of 18 and 35, which is a population considered to be more sensitive to sensory irritants. Russell and Rush (1996) exposed these human subjects via goggles to occupationally and environmentally relevant concentrations of MITC and measured five types of ocular responses: perceived irritation (visual analogue scale), rate of blinking, tearing, visual acuity, and structural alterations (hyperemia, edema) evident in photos of the eye. These assays would inevitably differ in sensitivity, as appropriate to gauge severity of effects.

Russell and Rush (1996) studied three durations of exposure (eight-hours, four-hours, and 14-minutes) in an effort to chart time-dependent responses. Testing occurred in three non-overlapping phases, such that all testing at eight-hours preceded that at four-hours, and so on. This regimen gave the investigators the opportunity to choose concentrations strategically, i.e., not to expose subjects unnecessarily. The levels ranged from 0.22 ppm for eight- and four-hour exposures up to 3.3 ppm for the 14-minute exposures. Measurements were taken at intervals throughout the exposure durations.

The investigators concluded from their statistical testing that only perceived irritation and blinking, variables known a priori as sensitive, held significant information about effects of exposure at the levels explored. Using those variables, they calculated a LOEL of 0.8 ppm and a NOEL of 0.23 ppm for exposures of an hour or more, with higher levels for brief exposure.

This report examines the results with techniques of quantitative risk assessment.

3.0 RESULTS

3.1 Modeling Results From Russell and Rush (1996)

[2] For example, some BMC bound calculations in this analysis, computed using the method in the ten Berge software, gave negative concentrations.

TERA (2007) contains the results from individual subjects for the variables of "perceived magnitude of irritation, blinking, and tearing. For perceived magnitude, *TERA* (2007) used the increment from the rating at t = 0 minutes to control for each individual's perception. For the variable labeled blinking, *TERA* used incremental blink rates. Unstimulated blinking, *TERA* notes, occurs at about 12 blinks per minute. Although Russell and Rush (1996) found no significant increment in tearing, it seemed prudent to re-examine the variable by individual in the risk assessment.

Russell and Rush (1996) had three separate exposure periods: eight-hours, four-hours, and 14-minutes. Each exposure duration and concentration used primarily different subjects, with some subjects used for more than one combination. The majority of the subjects served once or twice, and none more than four times. Before the onset of exposure, the subjects indicated little or no discomfort, as shown by a modal rating for perceived irritation of 0% of full scale and a rating below 5% in 90% of instances (Figure A1 of *TERA*, 2007). Much the same held true for ratings in the control (blank) exposures (Figure A2 of *TERA*, 2007).

The mean and standard deviation of responses in the control exposures permitted expression of responses during experimental exposures as normal deviates, i.e., z-scores. Hence, if a subject's response lay two standard deviations above the mean for the control exposure at the corresponding duration, then the response received a value of 2.0. If the response lay one and a half standard deviations above that mean, it received a value of 1.5, and so on. The procedure standardized the unit of measurement both within a variable, such as perceived magnitude, and across variables, such as perceived magnitude and blinking. Assuming an underlying normal distribution, a $z \geq 2$ would occur in less than 2.5% of cases in the control exposure.

For the irritation and blinking, a response was identified as adverse if at least one of following conditions held:

- a person had a value of $z \geq 2$ for the variable in question on two successive occasions; or
- a person had a value of $z \geq 2$ for the variable in question at the end of exposure when previous responses displayed a trend toward such a value.

This approach of requiring a response at more than one time point was used to minimize false positives from variability.

For tearing, a single value of $z \geq 2$ defined a response as adverse. Measurement of tearing occurred only occasionally during an exposure and required an accumulation of fluid over time. This reduced the concern about variability across time points.

TERA (2007) identified a person as a responder on a given trial if as the person gave at least two adverse responses (see Table 1). These frequencies became the input for the modeling.

Table 1. Responders by concentration for each exposure duration in Russell and Rush (1996)

Trial	Exposure Level (ppm)	Number of responders[3]	Total Number in Exposure Group
14-Minute Trial			
	0	0	10
	0.6	0	9
	1.9	3	9
	3.3	8	9
4-Hour Trial			
	0	0	12
	0.22	1	12
	0.8	5	9
8-hour Trial			
	0	0	12
	0.22	0	16

Figure 3 depicts how mean perceived magnitude of irritation (±SEM), expressed in units of the normal deviate[4], varied with time. The line at z = 0 corresponds to identify between experimental and control exposures. For exposure to the level 0.22 ppm for four or eight hours, perceived magnitude of irritation skirted along the line of identity over the entire duration. For exposure to 0.6 ppm over 14 minutes, perceived magnitude lay close to the line of identity. For exposure to 0.8 ppm over four hours, perceived magnitude lay above the identity line at 60 minutes, and tended to increase with exposure duration, reaching a maximum value of about z = 7. For exposure to 1.9 and 3.3 ppm, perceived magnitude began (1 minute) above the line of identity and increased sharply with exposure to 3.3 ppm reaching z = 15.

Based upon perceived magnitude of irritation data alone, one can place the NOAEL around 0.6 ppm for 14 minutes and perhaps longer, as EPA (2006) did for 14-minute exposures.

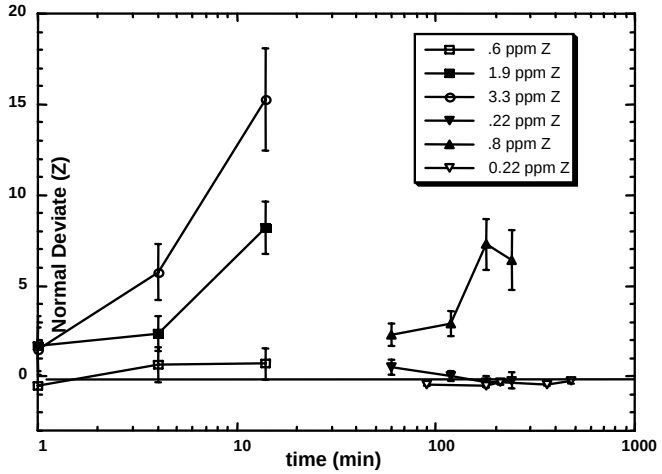

Figure 3. Mean perceived magnitude of irritation from MITC exposure (in ppm) vs. time, expressed as normal deviates (z), or the number of standard deviations from control

[3] Endpoints evaluated were perceived magnitude of irritation, blink rate, and tearing.

[4] A deviate is defined as one standard deviation from the control value; thus a deviate score of 2 reflects two standard deviations away from the control.

Figure 4 depicts how blinking varied with time and exposure level. The trends resemble those for perceived magnitude, though blinking exhibited less sensitivity, with a maximum response of $z < 3$. The difference in sensitivity between subjective and objective responses follows the common pattern of higher sensitivity for the subjective variable. Either variable alone, however, could qualify a person as a responder for purposes of the risk assessment.

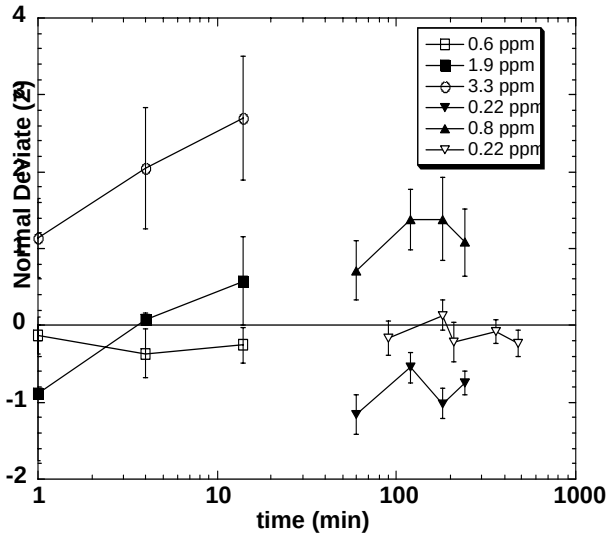

Figure 4. Incremental blinks per minute, expressed as z-scores re control, during exposure to MITC.

The NOAEL based on blinks would equal 0.6 ppm for 14 minutes, and perhaps longer, again consistent with the EPA (2006) NOAEL for 14-minute exposures.

Logistic and probit modeling, applied to the number of responders (see Table 1 and Methods), yielded acceptable fits (p-value greater than 0.1 as recommended by EPA's BMDS software) for only the factor of functions c and ln t (Table 2). Each gave almost identical estimates for BMC_{10} (Table 3).

Table 2. CxT modeling of number of responders

Model	**$f_1(c)$ =**	**$f_2(t)$ =**	**p-value for goodness-of-fit[a]**
Logistic	c	t	0.006
	c	**ln(t)**	**0.12**
	ln(c)	t	< .0001
	ln(c)	ln(t)	< .0001
Probit	c	t	0.01
	c	**ln(t)**	**0.15**
	ln(c)	t	< .0001
	ln(c)	ln(t)	< .0001

[a]EPA commonly recommends $p > 0.1$ as indicative of adequate fit.

The logistic and probit models from the BMDS software were fit separately to the 14-minute and four-hour data (Table 4).[5] The logistic and probit models yielded almost identical values per duration, a bit lower than yielded with the joint modeling.

Table 3. Combined CxT BMC_{10} estimates (ppm) at the three exposure durations

Model	14 minutes	4 hours	8 hours
Logistic	1.5	0.53	0.36
Probit	1.4	0.53	0.38

Table 4. Individual BMC_{10} and $BMCL_{10}$ estimates by BMDS models at two durations

Duration	Model	p-value for goodness-of-fit[a]	BMC	BMCL
14 minutes	Logistic	0.74	1.4	0.83
	Probit	0.85	1.4	0.78
4 hours	Logistic	0.44	0.37	0.22
	Probit	0.51	0.33	0.20

[a] EPA commonly recommends $p > 0.1$ as indicative of adequate fit.

The breadth of the bounds on $BMCs_{10}$ depends upon the number of observations in a calculation, with generally wider calculated bounds for fewer observations. The separate analyses for 14-minute and four-hour exposures entailed fewer observations per analysis than would the preferred joint analysis. This would suggest conservatism for the $BMCLs_{10}$ in Table 4, i.e., makes them more likely to be health protective. The results in Table 4 accord rather well with those in Figures 3 and 4.

3.2 Toxicity in Experimental Animals

A review of experimental animal data for eye or lung effects identified one well-designed study of acute toxicity (Jackson et al., 1981) and two of short-term to subchronic exposure (BASF, 1987; Rosskamp et al., 1978). The review rejected studies of Vapam Technical, which degrades into some volatile chemicals other than MITC (e.g., Knapp et al., 1983).

Jackson et al. (1981)[6] conducted an acute four-hour inhalation study with MITC on seven groups of 10 (five per sex) Sprague-Dawley rats. Rats were exposed to 0, 94, 166, 190, 210, 263 or 548 ppm (corresponding to 0, 282, 496, 570, 628, 786, or 1640 mg/m^3, respectively). Clinical signs of eye irritation (lacrimation and closed or partially closed eyes) were observed in 100% of the rats within 15 minutes of exposure at 94 ppm, the lowest exposure concentration (see Tables 5 and 6 in Appendix A). Lung effects (dyspnea and gasping) were seen at 263 and 548 ppm at 15-minutes of exposure. Clinical signs of lung effects were not observed at 94 ppm until after two-hours (see Tables 8 and 9 in Appendix A). Other effects included sneezing, hunched or prone posture, rubbing of chin or paws, peripheral vasodilatation, excessive salivation and, at the

[5] No separate modeling was done for the eight-hour data because there were only two exposure groups (including control) for that time, and there were no responders in either group.
[6] See Appendix A for a more in-depth analysis of the Jackson et al. 1981 study.

higher concentrations, convulsions and death. This study clearly illustrates that eye symptoms are the first to develop in time; signs of nasal and lung irritation develop later.

Rosskamp et al. (1978)[7] conducted a subchronic, nose-only inhalation study on 60 Wistar rats (three groups of 10 rats/sex) per concentration. Controls consisted of 40 rats (two groups of 10 rats/sex); one group of 20 was housed in the laboratory and the other in the exposure chamber. Rats were exposed to about 0, 0.1, 10, and 46 ppm (0, 3.16, 30.67, and 137.13 mg/m^3 [reported as ug/L], respectively) for four hours a day, five days per week over a total of 12 to 13 weeks. No effects were reported at the low concentration. At the mid concentration, decreased body weight, food efficiency and blood protein values alongside increased water consumption were observed. At the high concentration, the animals showed apathy, salivation, nasal discharge, and stimulated vocalization. Other clinical signs observed at the high concentration included dyspnea.

BASF (1987) conducted a short-term inhalation study on 30 Wistar rats (five rats per sex per concentration group). Rats were exposed to 0, 1.7, 6.7, and 33 ppm (0, 5, 20 and 100 mg/m^3, respectively) for four weeks. No substance related effects were observed at 1.7 ppm. However, reversible signs of mucosal and respiratory irritation were observed at 6.7 ppm. These effects became nonreversible at 33 ppm and led to changes in breathing patterns. Absolute lung weights were significantly increased at 33 ppm, in addition to significant gross and microscopic changes. See Appendix B for further analysis.

Table 5 summarizes measured outcomes for the eye of humans and for the eye, nose, and lung in rats. Both the humans and the rats exhibited joint effects of concentration and duration. The rat studies by their design could address relative potency of exposure by site and could reveal differences in the pattern of potency by site.

Figures 5 and 6 show the pattern for the eyes and lungs of rats as response surfaces (Jackson et al., 1981). To illustrate one edge of the surface, the number of rats that showed eye effects at the lowest concentration, 93 ppm, increased from a majority to 100% over four hours of exposure. The number that showed lung effects increased from zero through the first hour up to just 40% by the end of the fourth. For the shortest duration examined, 15-minutes, LOAELs for eye irritation, nasal irritation, and lung irritation equaled 1.8-fold for eye vs. nose, and greater than 3.3-fold for nose vs. lung, for a net effect of essentially six-fold.[8] As Figure 7 shows, only at combinations of exceedingly high concentrations and long durations, does the potency of MITC to irritate the lung catch up with its ability to irritate the eye (for more details on the creation of these figures, see Appendix C.

[7] *TERA* could not obtain the full unpublished study of Rosskamp et al. (1981), but instead reviewed the summary within the Data Evaluation Record provided by the EPA (1994b)

[8] Note: There is a disparity between *TERA*'s reported NOAELs and LOAELs from the Jackson (1981) study and those of Dr. Thomassen (Appendix A). *TERA* based its assessment on the sentinel effect of eye irritation, which is not, in a pathological sense, truly adverse. Dr. Thomassen based his NOAEL and LOAEL on the time and concentration when tearing, the body's defense mechanism, ceased to function properly.

Table 5. Eye, nasal, and lung effects in human and animal studies of MITC[9]

Key Event	NOAEL (ppm)	LOAEL (ppm)	Duration	Reference
Eye Irritation	0.6	1.9 Human eye irritation	14 minutes	Russell and Rush 1996
Eye Irritation	< 94	94 Rat lacrimation, eye closing	15 minutes	Jackson et al. 1981
Eye Irritation	< 94	94 Rat lacrimation, eye closing	2 hours	Jackson et al. 1981
Eye Irritation	0.22	0.80 Human eye irritation	4 hours	Russell and Rush 1996
Eye Irritation	< 94	94 Rat lacrimation, eye closing	4 hours	Jackson et al. 1981
Eye Irritation	0.22	>0.22 Human no observed effects	8 hours	Russell and Rush 1996
Nasal Irritation	94	166 Rat sneezing	15 minutes	Jackson et al. 1981
Nasal Irritation	6.7	33 Rat rhinitis	20 days	BASF 1987
Nasal Irritation	10	46 Rat nasal discharge	90 days	Rosskamp et al. 1978
Lung Effects	>548	> 548 Rat no observed effects	15 minutes	Jackson et al. 1981
Lung Effects	94	166 Rat dyspnea and gasping	2 hours	Jackson et al. 1981
Lung Effects	< 94	94 Rat dyspnea and gasping	4 hours	Jackson et al. 1981
Lung Effects	6.7	33 Rat increase in lung weight and gross pathology of the lung	20 days	BASF 1987
Lung Effects	10	46 Rat dyspnea	90 days	Rosskamp et al. 1978

The pattern of convergence of potency in the direction of high concentrations and long durations should of course reflect itself in the opposite direction of divergence. At the much lower levels

[9] The use of the term NOAEL and/or LOAEL for lacrimation, eye closure, and sneezing may be inappropriate. See Appendices A and B for further discussion.

of stimulation pertinent to the human study, the pattern of divergence would likely show itself even more extremely, namely, an even larger ratio of the eye vs. lung.

The animal studies with exposures beyond the acute scenario also indicate particular sensitivity of the eye to MITC. For example, a comparison of the 20-day NOAEL of 6.7 and 33 ppm of BASF (1987) for lung and nasal effects with the eight-hour human NOAEL of 0.22 ppm for the eye yields a difference of 30- and 150-fold, respectively. A comparison of the 90-day Rosskamp et al. (1978) lung and nasal NOAEL of 10 ppm with the human NOAEL of 0.22 ppm equals ~45-fold.[10] Data used for these comparisons are summarized in Table 5.

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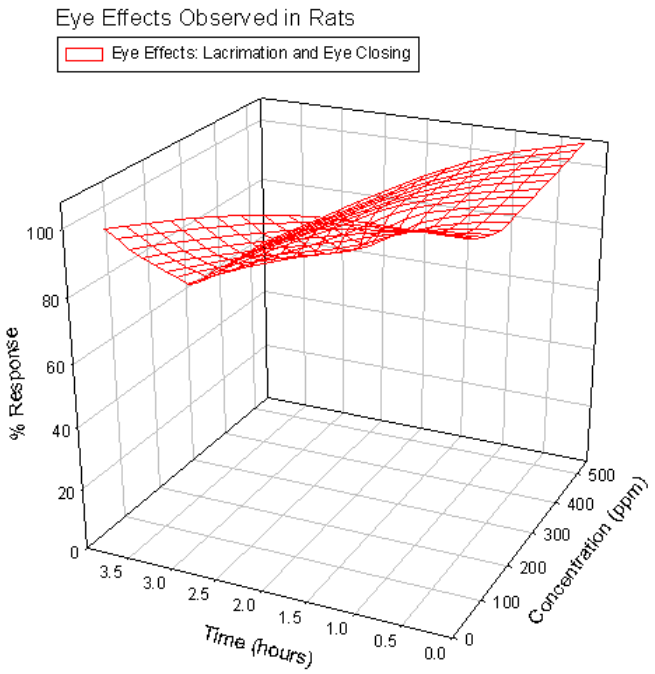

Figure 5. Eye responses, manifested as lacrimation or lid closing, vs. concentration and duration of exposure. The combined percentage of responses of the two measures assumed independence of each and was corrected for joint-responses. Based upon data from Jackson et al. (1981).

[10] These comparisons could be adjusted to reflect the difference in species and duration, but the adjustments tend to balance each other. For example, an interspecies UF of 10-fold could be applied to the experimental animal NOAELs of BASF (1987) and Rosskamp et al. (1978), but these NOAELs are from longer-term exposures than the human study, and would likely be greater if the exposures were acute.

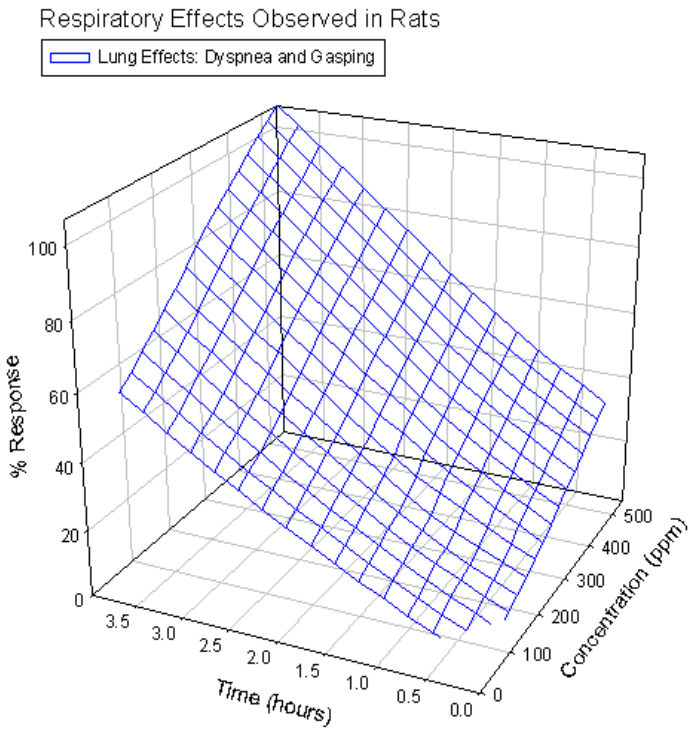

Figure 6. Lung responses, manifested as dyspnea or gasping, vs. concentration and duration of exposure. The combined percentage of responses of the two measures assumed independence of each and was corrected for joint-responses. Based upon data from Jackson et al. (1981).

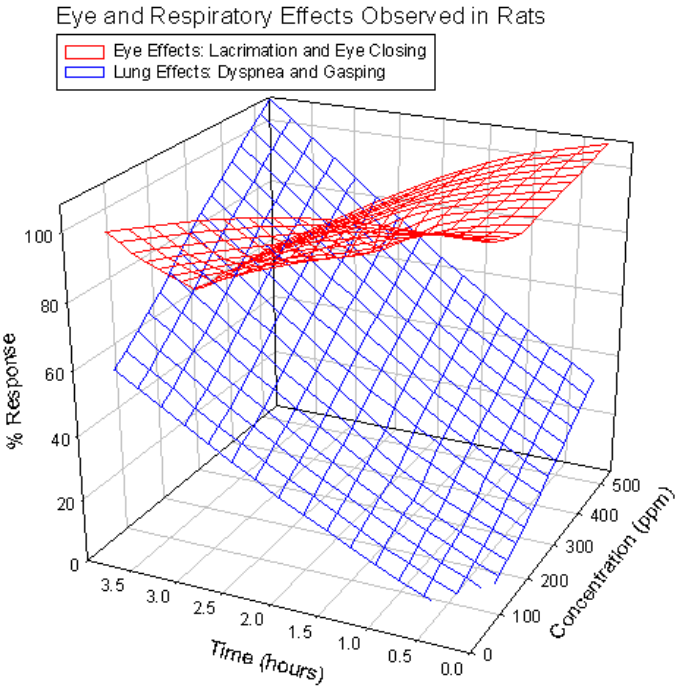

Figure 7. Response surfaces from Figures 5 and 6 plotted together.

3.3 Analysis of Human Incident Reports

In an enumeration of adverse effects associated with exposures to agricultural uses of metam-sodium, metam-potassium or dazomet between 1992 to 2003, the California Department of Pesticide Regulation (CDPR) reported that 657 of 777 cases, or 84.6%, involved either eye effects alone or eye effects in conjunction with respiratory, skin, or systemic effects (Akanda, 2007; see Table 6). Accordingly, only 120 cases, or 15.4%, entailed no report of eye effects, some because exposure involved just the skin. The report did not include estimates of levels of exposure.

Table 6. Frequency of illnesses associated with exposure to metam-sodium, metam-potassium and dazomet resulting from agricultural uses

Type of illness	Number of cases	Percent of total
eye	294	37.8%
eye, skin,	3	0.4%
eye, systemic	112	14.4%
eye, respiratory	102	13.1%
eye, skin, systemic	5	0.6%
eye, skin, respiratory	4	0.5%
eye, respiratory, systemic	116	14.9%
eye, skin, respiratory, systemic	21	2.7%
All eye effects	**657**	**84.6%**
skin	21	2.7%
systemic	34	4.4%
respiratory	14	1.8%
skin, systemic	11	1.4%
skin, respiratory	4	0.5%
respiratory, systemic	32	4.1%
skin, respiratory, systemic	4	0.5%
All non-eye effects	120	15.4%

O'Malley et al. (2005), who enumerated on effects on bystanders following shank-application of metam-sodium in Arvin, CA, found that 173 of 178 persons, or 97%, had symptoms of either burning or tearing eyes and sore throat. The residual symptoms, included headaches, vomiting, nausea, and asthma/lower respiratory irritation. Several persons with more severe symptoms also noted eye irritation. Estimated concentrations ranged from 0.4-0.8 ppm for a one-hour time-weighted average (TWA) and 1.6 to 2.4 ppm for a short-term TWA. Eye irritation not only occurred most frequently but commonly appeared before other symptoms.

The CDPR (2001) and O'Malley et al. (2004) reports described an accidental exposure to MITC in Earlimart, CA. The CDPR used geographic distance from the accident to designate estimated levels of exposure, with zone A closest to the field and zone D farthest. Symptoms of eye irritation occurred in most reported cases in all zones: 81% of the 136 cases in zone A, 61% of the 18 cases in zone B, 50% of the 10 cases in zone C and 60% of the 5 cases in zone D (CDPR, 2001). Other non-specific symptoms and respiratory complaints also occurred in each zone, but in fewer people in zones A and B, those closest to the incident. Estimated TWA concentrations ranged from approximately 0.5 to 1 ppm (O'Malley et al., 2004).

For more in-depth information on incidents, *TERA* asked the CDPR to provide their Pesticide Illness Surveillance Program (PISP) database for MITC for a record of every illness report submitted from 1992 to 2006 and a brief description of the symptoms (Appendix D). The reports and codes provided by the CDPR enabled us to denote distance from an incident.

For the Arvin incident, *TERA* categorized the responses of those people whom CDPR had labeled as definitely or probably exposed (*responders* in our terminology) regarding the symptom of eye irritation alone, eye irritation and any other symptom, and another symptom without eye irritation. *TERA* segregated this information by CDPR-provided distance codes: Code 1 referred to people who resided on the road bordering the treated field, Code 2 to the people who resided on the second closest road to the treated field, and Code 3 to a packing plant located beyond the second road. As distance from the agricultural field increased (from Code 1 to Code 3), so did the percent of symptoms of just eye irritation. Commensurately, the percent of eye plus other symptoms decreased (Figure 8).Of the 245 responders, only two people reported respiratory symptoms without eye irritation, one was located in Code 1 and the other in Code 2). Of 71 responders working at a carrot packing plant on the outskirts of the residential area (Code 3), 70 reported just eye irritation and one reported both eye and respiratory symptoms, specifically throat irritation.

Figure 9 contains computations for the average concentrations within the three codes. O'Malley et al. (2005) provided the information needed to compute the averages, which ranged from 0.95 ppm for Code 1 to 0.45 ppm for Code 3. The result suggests that the carrot workers would have had about half the level of exposure as persons adjacent to the field.

The data on concentration from the Earlimart incident proved more variable within Codes than those from the Arvin incident. The Codes may have indicated place of residence rather than place of exposure. Moreover, since the incident occurred around 5 pm, it may have caught people in flux.

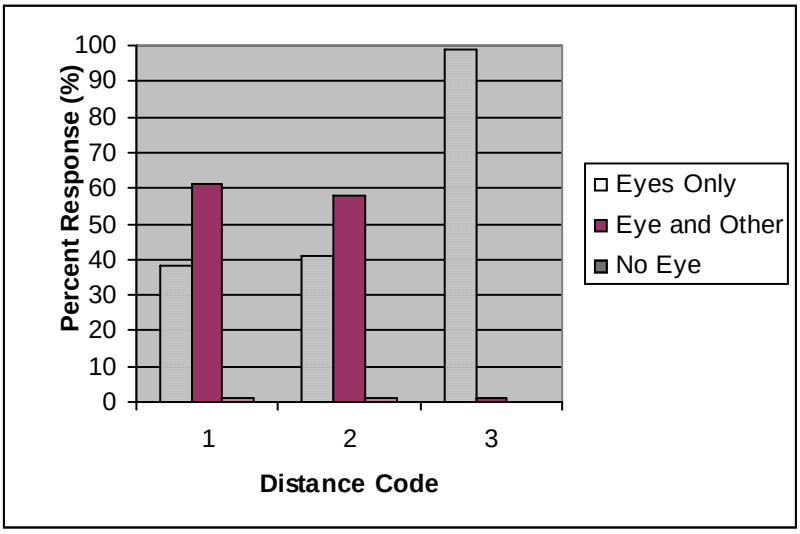

Figure 8. Percent of responders in the Arvin incident who experienced eye irritation only, eye irritation in conjunction with other symptoms, or other symptoms without eye irritation, in relation to their distance from the treated field

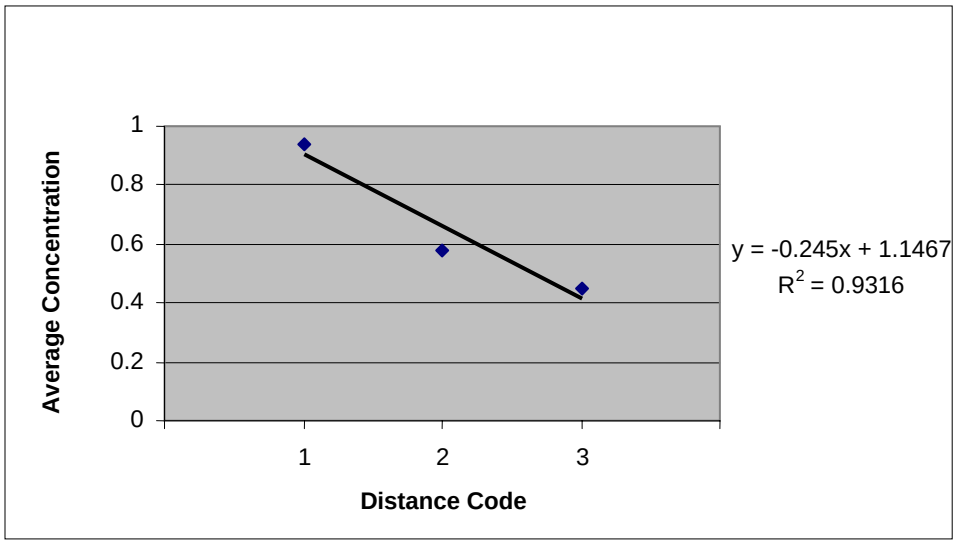

Figure 9. Average MITC concentration estimates (obtained from O'Malley et al., 2005) are shown in relation to the distance codes provided by the CDPR. Distance code 3 represents the farthest distance from the treated fields

Apart from information on the Arvin and Earlimart incidents, the PISP database included information on asthmatics with respiratory symptoms (see Table 7). *TERA* compared the notes provided in the CDPR summaries with the full medical reports provided by CDPR and the Pesticide Episode Investigation Supplemental Reports (PEISRs) in an effort to piece together the complete story behind each case. Some discrepancies appeared. In some cases, the medical reports or PEISRs indicated that the person's symptoms were unrelated to the chemical. In other cases, the brief CDPR summaries omitted relevant information. In other cases, however, the

reports contained no additional information. Of the 13 asthmatics identified in the complete medical records, only five had symptoms unrelated to eye irritation that were clearly connected to MITC exposure (see Table 7; case numbers 1999-1174, 1242, 1249, 1252, 1503). Two of the five also had severe health problems unassociated with asthma (Case numbers 1999-1249 and 1252) that may have lead to hypersensitivity. Although exposure to high levels of MITC may exacerbate existing cases of asthma, the effect may well be less severe than the brief summaries indicated. The case that asthmatics have thresholds for respiratory symptoms at or near those for ocular symptoms seems weak indeed.

Table 7. Summary of the CDPR, incident, and medical reports on asthmatics involved in various exposure incidents

Case #	Symptoms as described in CDPR summaries	*TERA's* comments about reported symptoms based on incident reports and medical records	*TERA*'s additional comments
1994-196	Chest tightness, cough, sore throat, vomiting	This worker was wearing goggles, preventing any eye effects from occurring. Medical report indicates chest tightness had been pre-existing.	
1996-1744	Eyes are irritated, chest stings when breathing	Medical records indicated that symptoms were unrelated to the chemical	
1997-1812	Rash on the legs, wheezing	Child had a previous history of rash and skin problems. Note on the report says that the child was "crying, very irritable"	17 mo. old child – because of the child's age, he is unable to clearly describe his own symptoms. There is no definite way to determine whether the crying was due to eye irritation, general discomfort, or other causes. The pesticide Episode Investigation Supplemental Report states that the medical records did not indicate that pesticides, more specifically metam-sodium, were related to the illnesses.
1997-1820	Difficulty breathing	Medical report states that her "lungs are clear with no air space or interstitial disease" and existing bronchitis before the incident. She did not seek medical treatment until 4 hours after experiencing symptoms. Uses inhaler 3x per day, indicating frequent breathing problems unrelated to MITC.	The Pesticide Episode Investigation Supplemental Report states that the medical records did not indicate that pesticides, more specifically metam-sodium, were related to the illnesses. The woman drove through the area, not a resident.
1997-1826	Eye and nasal irritation, headache	Only evidence of nasal irritation is a runny nose. No cough, asthma, or other lower respiratory effects.	The pesticide Episode Investigation Supplemental Report states that her illnesses were not related to pesticides, more specifically metam-sodium.
1997-1837	Eye irritation, dizziness, sore throat, lower abdominal pain – premature labor contractions	Incident report indicates that this person did NOT have dizziness or sore throat. She did have a headache and chest tightness that were not described by CDPR.	The pesticide Episode Investigation Supplemental Report states that the illnesses were not related to pesticides, more specifically metam-sodium.
1999-1174	Respiratory (coughing), chronic asthma and allergies are more pronounced	No pertinent new information.	CDPR has stated that it is unclear whether the cough changed as a result of exposure.
1999-1239	Burning eyes, nose, throat and shortness of breath	There is no mention of sore throat in the reports. He reported mild increased difficulty in breathing.	History of emphysema, asthma, and bronchitits. Uses oxygen at home.
1999-1241	Burning eyes, transient shortness of breath, nausea	The physician's description is illegible. The child's description mentions no symptoms other than burning eyes.	8-year old child.
1999-1242	Shortness of breath, mild wheezing, chest pain, sore throat, cough, headache	No pertinent additional information.	18-year old female.
1999-1249	nausea, bronchial irritation, shortness of breath, mild wheezing, cough, elevated blood pressure	No pertinent additional information.	History of bronchitis and an unspecified heart condition.
1999-1252	headache, vomiting, hypertension, burning throat, shortness of breath, chest pain, cough	No pertinent additional information.	Pre-exisiting high blood pressure and history of hypertension.
1999-1503	Difficulty breathing, tearing	No pertinent additional information.	

4.0 DISCUSSION

In evaluations of safe concentrations, the EPA routinely considers uncertainty associated with extrapolation from experimental animals to humans, use of a LOAEL rather than a NOAEL, use of a study of insufficient exposure durations, database incompleteness, and within-human variability (EPA, 2002). Since we judge, as does the EPA (2008a) and the NAC (EPA, 2008b), that the human study of Russell and Rush (1996) is the best basis for the development of short-term safe concentrations, a UF for extrapolation from experimental animals to humans is not needed. In addition, since we use $BMCLs_{10}$ as the basis of our safe concentration, the need for a UF to extrapolate from LOAEL to NOAEL disappears. Furthermore, since our analysis includes studies that test the appropriate duration of exposure, a UF for this area also disappears.

One might contemplate a UF for sufficiency of database if some question existed as to whether symptoms in the eye are not the critical effect. However, review of the available literature, summarized above and in previous reports (EPA, 2007; *TERA*, 2007) indicates that eye symptoms occur first, or at worst concurrently with any other symptoms, in nearly all exposures in the field (see Figure 8). Perhaps more importantly, eye effects occur first in controlled exposures to experimental animals in both time and concentration. No study has indicated any effect below the threshold for eye irritation in short-term exposures. Accordingly, any judgment of deficiency of the database seems unwarranted and a UF for this area is unnecessary.

In contrast, a UF for within human variability, which protects sensitive populations, deserves consideration in this risk assessment. Recent guidelines of the EPA (2002) and IPCS (2005) are pertinent in this evaluation. Several considerations, related to toxicokinetic and toxicodynamic variations among individuals, are involved when choosing a UF to protect sensitive populations. Both guidelines indicate that the usual UF of 10-fold for within human variability can be considered as two equal parts, one for toxicokinetic variability and one for toxicodynamic variability. Each subfactor is "assigned" a value of ½ log base 10, or an approximate value of 3. This assignment of a 3-fold factor for part of the default value of 10 has a long-standing EPA practice as evidenced by numerous assessments on EPA's Integrated Risk Information System (IRIS, 2008), in its methods (EPA, 1994, 2002), and in the published literature (Dourson et al., 1996).

4.1 Mode of Action[11]

The first step in consideration of refinement of UFs is characterization of mode of action (MOA). The MOA framework, based in large part on the Bradford-Hill criteria for determining causality in epidemiology studies, describes a multi-step process for evaluating data in humans and experimental animals. For MITC, the MOA for the critical effect of eye irritation appears to be stimulation of the trigeminal nerve as discussed above. These are local as opposed to systemic effects. They require no systemic metabolism of the inciting agent for the sensations or reflexes to occur.

4.1.1 Key events

[11] Please note that sections 4.1 and 4.2 have been written based on the EPA analysis for chloropicrin (EPA, 2008c).

The well-conducted human study (Russell and Rush, 1996), the experimental animal data, and the available human incident reports all support sensory irritation as the critical effect for MITC. The majority of these data show that eye irritation occurs first as MITC concentration increases (e.g., Figure 7), or is virtually the only symptom at relatively low MITC concentrations (e.g., Figure 8). Figure 10 below outlines the key events of MITC eye irritation.

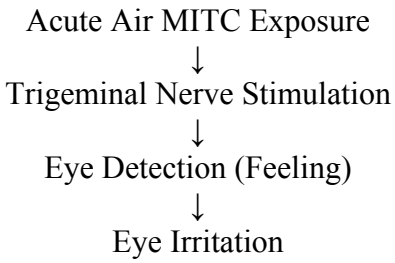

Figure 10. Key events in the MOA of MITC

4.1.2 Concentration-Response

Table 5 highlights irritation concentration-response relationships, including those of the key events highlighted in Figure 10. From the Table it is apparent that concentration and duration of exposure are important in the irritation of the target tissue, onset of effect, and severity of irritation. As the concentration increases, the severity of the portal-of-entry effect also increases. Acutely, eye effects are more sensitive than the expected or observed lung effects by between 40 and 90 fold, with the sensitivity of nasal effects falling roughly between these two.

4.1.3 Temporal Association

Table 5 shows a clear difference in the onset of irritation in different organs in experimental animals. For example, Jackson et al. (1981) showed that MITC at 94 ppm evokes eye irritation characterized by lacrimation and eye closing at the earliest observation of 15 minutes. At the same interval, effect levels for nasal irritation and lung irritation equaled 166 ppm and >548 ppm, respectively. Russell and Rush (1996) showed that exposure of humans to MITC at either 1.9 or 3.3 ppm for 14-minutes, or 0.80 ppm for four-hours, evokes trigeminal nerve sensations in the eyes such as perceived irritation (visual analogue scale), rate of blinking, and tearing, without producing clinical signs of eye irritation, such as impaired visual acuity, hyperemia, and edema. Exposure of humans at 0.22 ppm for eight-hours resulted in no effect. Several of the human incident reports also show eye effects exclusively, or eye effects along with other effects, and some of the eye effects are noted to occur immediately after exposure was noticed (see Table 6 and/or Appendix D).

As concentration and duration of exposure increases, sensation in the eyes evolves into eye irritation as well as sensations in the nose followed by nasal irritation. With continued MITC exposure eye and nose irritation will develop into respiratory irritation. For example, respiratory irritation was evident in rodent studies with LOAELs of >548 ppm for 15 minutes, 166 ppm for two hours, 94 ppm for four hours, or 46 ppm for 90 days (Table 5). This sequence of LOAELs

in the lung is well above that for nasal irritation, except for the longest duration, and even further above the LOAELs for eye irritation found in humans. Thus, the rodent database demonstrates that increased MITC concentrations can produce irritation in eyes, nose and lungs within several minutes to four hours. The rodent studies, however, cannot provide the latency to irritation interval, a key effect in Russell and Rush (1996). Concentrations in the human study are clearly orders of magnitude lower than concentrations evaluated in the rodent studies.

4.1.4 Strength, consistency, and specificity of association of key events

The rodent database for MITC demonstrates both the dose-response and temporal relationship of portal-of-entry effects. For example, Figure 7 shows an increasing latency between eye irritation and lung irritation. In addition, Table 5 shows that LOAELs are lower for eye irritation when compared with either nose or lung irritation at comparable durations.[12] As expected, more severe effects, such as mortality, occur at concentrations higher than those which cause irritation for short exposures (i.e., at 548 ppm for two hours---Jackson et al., 1981).

The human database for MITC also supports the key events outlined in Figure 10. For example, Russell and Rush (1996) showed that MITC clearly evokes the sensation of eye feeling without producing clinical signs of eye irritation. Four or eight-hour exposures to 0.22 ppm failed to produce even eye sensation. This level of 0.22 ppm is ~four-fold lower than the concentration at which sensitive humans were capable of consistently detecting MITC (0.8 ppm for four hours) in the eyes. This level is ~400-fold lower than the acute rodent inhalation effect level of 93 ppm showing eye irritation after 15 minutes, but perhaps more importantly, this level of 0.22 ppm is ~200-fold lower than either increased lung weight or lung irritation produced in repeat inhalation rodent level of either 33 ppm for 28 days or 46 ppm for 90 days, respectively.

4.1.5 Biological plausibility and coherence

For MITC, the temporal concordance and concentration dependence of eye irritation is consistent with the MOA and is biologically plausible. Coherence is addressed by evaluating both the animal and human data for the target tissue. Consistent port of entry effects are apparent in the rodent and human studies. Recognition of eye sensations is not possible in experimental animals and therefore is addressed in the human study. Furthermore, MITC behaves similarly to other sensory irritants such as chloropicrin (EPA, 2008c) and carbon dioxide (CO2) (Stevens and Cain, 1986; Kjaergaard et al., 1992; Shusterman et al., 2001; Frasnelli and Hummel, 2003; Shusterman et al., 2003).

4.1.6 Uncertainties, inconsistencies, and data gaps

While gaps in the database may exist regarding the concentration and onset of nasal and lung irritation in humans, and regarding eye irritation beyond eight-hours exposure, human incident reports are somewhat helpful in filling in these gaps. In general these reports show the progression of eye, nasal and lung irritation similar to that observed in experimental animals.

[12] The exception here is the identical LOAELs of 94 ppm for both eye and lung irritation of Jackson et al. (1981) at 4 hours, but we judge this to derive from the absence lower concentrations. See also a review of this study in Appendix A.

These incident reports cannot be used to make definitive statements, however, since exposures are generally not known or modeled (for an attempt at quantification see Figure 9).

Controlled exposures to humans for concentrations above 3.3 ppm are not available due to scientific and ethical considerations, since such concentrations might be expected to produce severe irritation. However, the current temporal concordance data as shown in Figures 3 and 4 suggest that as duration of exposure continues, the sensation of eye feeling would not progress unless the concentration also increased. This suggestion is supported by data shown in Table 5 where NOAELs and LOAELs for nasal and lung irritation are roughly similar after exposure to rats for either 20 or 90 days. Moreover, these latter NOAELs and LOAELs are much higher than the eight-hour NOAEL for human eye irritation of 0.22 ppm. In fact, depending on exposure time, nasal NOAELs in rats vary from 6.7 to 94 ppm; lung NOAELs vary from 6.7 to >548 ppm. All of these NOAELs are much higher than this human NOAEL of 0.22 ppm. Therefore, we expect that an exposure beyond eight hours at 0.22 ppm would not produce much in the way of eye irritation, and is highly unlikely to produce nasal or lung irritation.

4.2 Intra-Species Factor—Using Chemical-Specific Information to Refine the Factor

As mentioned in the Methods, IPCS (2005) describes approaches for use of kinetic and mechanistic data to refine interspecies and intraspecies extrapolation factors, referred to as Chemical Specific Adjustment Factors (CSAFs). As discussed above, understanding the MOA for a critical effect is an important component of deriving CSAFs in that a MOA provides the foundation for understanding which toxicokinetic and/or toxicodynamic characteristics are critical for assigning the intraspecies UF. The critical effect for MITC is well understood to be stimulation of sensation in the eyes.

When deriving CSAFs, the intraspecies factor is separated into toxicokinetic and toxicodynamic components. In general, a reduced factor for within human variability is often used for irritants, based on the expected minimal variability in toxicokinetics due to direct contact. In the case of MITC, direct contact with the eye stimulates the trigeminal nerves as discussed above. This MOA supports the minimal toxicokinetic variation among humans and a reduced factor from the default value of 3 for this subfactor.

The fact that the eye effects are, or are very likely to be, the first response in human exposures, and are the first response in experimental animal inhalation exposures also adds to the weight of evidence that the effect is direct acting, since the eye is exposed first in these situations. For example, the study of Jackson et al. (1981) shows approximately a >2-fold lower irritation LOAEL for eye when compared with nose, and approximately a >6-fold lower irritation LOAEL for eye when compared with lung. Comparisons of LOAELs for eye irritation in humans to LOAELs for nose or lung irritation LOAELs in experimental animals show even larger factors (see Table 5). Since the pathway of exposure is direct MITC-containing air where surface reaction with the trigeminal nerve evokes sensations in the eyes and, furthermore, since internal dose or target tissues are not a concern for MITC because eyes are stimulated by surface concentrations, of the parent (rather than a reactive metabolite), no relevant variability in human toxicokinetics is expected.

Based on these considerations, a CSAF of 1, rather than the default value of 3-fold, is reasonable for the lack of toxicokinetic variability among humans to this critical effect of eye irritation.

Toxicodynamics are also important in determining and quantifying the sequence of events at the cellular and molecular levels that lead to a toxic response. This is because variations in receptor binding, number of receptors, and other conditions that might affect neurological response are known to exist among humans. Three main questions, as discussed below, are outlined in the IPCS (2005) guidance document for the determination of the adequacy of the human and experimental animal data for refinement of the toxicodynamic component. We first address these questions for the critical effect, eye irritation. Because the CSAF for this endpoint is less than the default, we then consider other potential critical effects and what the appropriate uncertainty factor(s) would be, in order to determine the final critical effect.

4.2.1 Relevance of population

Ocular irritation shows only minor variation in sensitivity among subjects aged 18 to 35 years and screened for ocular health (e.g., Cain et al., 2005, 2007). The chemesthetic studies also show quite steep stimulus-response (psychometric) functions at threshold. Furthermore, chemesthetic sensitivity diminishes little, if at all, from early to late adulthood, with some acceleration of loss in the seventh decade (Wysocki et al., 2003). Persons less than 18 years appear to have no greater sensitivity to irritating stimuli than do young adults. Children between five and 14 years evinced essentially the same sensitivity as subjects aged 15 to 20, and 21 to 54 (Hummel et al., 2007). Further support for a smaller UF than the default value of 3, for toxicodynamics of irritation endpoints, is provided by the data of Kjaergaard et al. (1992); this demonstrates that the threshold for sensitive individuals lies within a factor of 2 of the (average) response of young adults. Note that the Kjaergaard ratio is between the mean response of the young adults and a highly sensitive group. Thus, based on the literature, toxicodynamic variability for irritation endpoints is likely to be smaller that the default toxicodynamic value of 3-fold would indicate.

Specific data for MITC also argue for a reduced toxicodynamic UF. For example, Russell and Rush (1996) tested human volunteers of both sexes of various ages and health conditions. The severity of eye irritation was quantified by both subjective and objective criteria. The subjective scales were clearly more sensitive than objective clinical signs. This fact is consistent with the MOA of MITC being stimulation of the trigeminal nerve. Furthermore, Russell and Rush (1996) included both males and females, younger and older subjects, smokers and nonsmokers, allergic and non-allergic subjects, and those exposed and not exposed to chemicals in the workplace. This inclusiveness suggests enough diversity in the Russell and Rush (1996) study to represent a range in the population. In particular, the age of the majority (58%) of subjects in Russell and Rush (1996) lay below 35 years, which is the sensitive age range for this kind of testing. An initial analysis of these data showed that the younger members of the Russell and Rush (1996) study showed an increased sensitivity (*TERA*, 2007). Thus, the sensitive portion of the human distribution of variability appeared to be well-represented in the Russell and Rush (1996) population, since young adults constituted the majority of the sample, and that the resulting NOAELs or $BMCs_{10}$ are more representative of those from sensitive subpopulations.

As shown in Appendix D, MITC incident reports support a consistent finding of eye irritation across all age groups, and also support the findings of Russell and Rush (1996). Irritation to the eyes is the apparent first effect in many children and adults at similar exposures. Thus, both data from literature reviews on irritation endpoints and specific data for MITC indicate that little toxicodynamic variability is expected and that a reduced factor is appropriate.

In related work, CO2, a sensory irritant, was tested in 158 subjects, including only one individual with asthma and nine others with hayfever. CO2 proved no more sensitive in the upper airways and eyes during nonsymptomatic periods in these subjects nor did they differ from other subjects in their response to CO2 (Kjaergaard et al., 1992). Likewise, subjects with nasal allergies were similar to individuals of the same age to nasal detection of CO2 (Shusterman et al., 2003). These data, although limited, are consistent with that found by Russell and Rush (1996), supporting the contention that these investigators tested the relevant population.

4.2.2 Adequacy of concentration-response data

All three phases of the Russell and Rush (1996) human study provide timing of the critical effect in the relevant range of environmental exposure. An integration of three of these eye effects allowed adequate quantitative information in order to develop a $BMCL_{10}$, of approximately 0.2 or 0.8 ppm (see Table 4), which *TERA* (2007) used as the PODs to establish a safe short-term inhalation levels. The results of the human study are consistent with the available literature regarding higher concentrations of MITC. This literature, both for humans and rats, suggests that both concentration of MITC and duration of MITC exposure are key components in the development of irritation, the onset of irritation, and the severity of the irritation. Concentration-response data both human and rat exposures to MITC are shown in Table 5.

The choice of toxicodynamic UF should also consider the interplay between identification of the $BMCL_{10}$ and human variability. The $BMCL_{10}$ represents the lower bound on the response of a small percentage (10%) of a test population selected to represent the sensitive end of the general population. Indeed, based on a visual estimate of the BMC modeling results from *TERA* (2007), the best estimate of the response at the $BMCL_{10}$ for overall effects can be 1-3%. Thus, the response at the $BMCL_{10}$ is very near a true threshold in the test population. Moreover, the chosen $BMCLs_{10}$ are from the individual time trials found in Table 4, and are expected to be lower than $BMCLs_{10}$ that might be projected from the $BMCs_{10}$ calculated using the preferred approach, and found in Table 3. This added conservatism in choice of $BMCL_{10}$, although modest, further supports the conclusion that a reduced UF for toxicodynamics will adequately protect the sensitive end of the general population.[13]

4.2.3 Adequacy of number of subjects/samples

The MITC human study of Russell and Rush (1996) evaluated a total of 70 subjects of both sexes and various ages and health backgrounds. Some subjects participated in more than one

[13] *TERA* discussed with EPA staff whether the ongoing revisions of the EPA's BMD/C software would allow the estimation of lower limits integrated over time, as for the ten Berge model described by *TERA* (2007). Dr. Jay Zhao of EPA (NCEA, Cincinnati, Ohio, 513-569-7373) stated that current revisions would not have this feature, but that categorical regression, another EPA model, could be used for this determination.

phase of the study. This study provided sufficient information for a sensitive subpopulation for sensory irritants, because the design of the study monitored effects based on the known sensitive subgroup, young adults. As expected, variability existed in the ability of these subjects to detect MITC, with individuals less sensitive to the feeling of MITC being unable to detect it at the lower concentrations. At the lowest concentrations at each time point, no convincing irritation was produced, most likely due to the fact that concentrations were not high enough to achieve surface reactions in the eye or that other defensive mechanisms of the eye were not overwhelmed.

The dose-response data from 14-minutes and four-hours were used to develop a $BMCL_{10}$ of approximately 0.2 and 0.8 ppm, respectively. Since Russell and Rush (1996) tested sensitive individuals, these $BMCLs_{10}$ are likely to be below concentrations detectable by the general population and therefore protective. Furthermore, developmental and reproductive rodent studies failed to identify any toxicity in life stages that is more susceptible than eye irritation.

Incident data, such as that of the previously described Arvin and Earlimart exposures, provide support for the use of the findings of Russell and Rush (1996). As previously discussed in Section 3.3, a majority of people in these incidents reported experiencing eye irritation (Akanda, 2007; O'Malley et al., 2004, 2005); several asthmatics also report eye irritation and other symptoms. Additionally, the acute animal study by Jackson et al. (1981) shows that eye effects occur first, but that with increased concentrations and time nasal (sneezing) and respiratory irritation and effects (dyspnea and gasping) will develop. These effects are parallel to those seen in the human incident reports. As also described in Section 3.3, the Arvin incident shows increasing severity of effects with relative increase in concentration of MITC.

Based on the known MOA for MITC and the consistency and specificity of eye irritation in both young and old individuals from incident and literature studies, robust dose-response and temporal concordance of eye and irritation effects from the MITC database, and the fact that conservative $BMCLs_{10}$ are based on Russell and Rush (1996) who tested an adequate number of subjects, including sensitive subgroups, it is reasonable to reduce the toxicodynamic component of the intraspecies factor to 1.

Therefore, the overall intraspecies factor for MITC, based on both toxicokinetics and toxicodynamics, is reduced to 1-fold. This judgment is similar to that made recently by the EPA's NAC (EPA, 2008b).

4.2.4 Uncertainty factor for nasal and lung irritation.

As discussed under Methods, the IPCS (2005) guidelines recommend that once an evaluation of UFs is done for the critical effect, in this case eye irritation, and the CSAF is less than the default value of 10-fold, then additional evaluation is needed for other closely related effects. For MITC, nasal and lung irritation are closely related effects. Thus, it is appropriate to consider whether UFs for these endpoints would suggest a safe concentration after short-term exposure that is lower than that based on eye irritation.

As shown in Table 5, a clear >6-fold separation exists in rats among LOAELs for eye and lung

irritation after 15 minutes from Jackson et al. (1981); this difference wanes at longer exposures, but this lack of difference may be due to the lack of lower level exposure. Table 5 also shows a large difference between NOAELs of eye irritation in humans when compared with lung irritation in experimental animals; this difference is likely to be in the 400- to 900-fold range for comparable lengths of exposure, or 40 to 90-fold after division by a 10-fold UF for interspecies extrapolation.

All of these facts address concerns that nasal or lung irritation might occur at concentrations below those evoking eye irritation, even with a default UF of 10-fold for within human variability. For example, the 15-minute NOAEL of 548 ppm for lung irritation found in the Jackson et al. (1981) study of rats, when divided by default UFs of 10-fold for experimental animal to human extrapolation and 10-fold for within human variability, results in a safe concentration of 5 ppm, well above the 14-minute human NOAEL of 0.6 ppm for eye effects. A 90-day study NOAEL of 10 ppm for dyspnoea found in the Rosskamp et al. (1978) study of rats is more than approximately 45-fold above the eight-hour human NOAEL of 0.22 ppm for eye effects (a strict comparison of UFs here is made difficult because of the time differences in exposure, but this 45-fold difference would only be greater if these exposure times were somehow equilibrated).

One additional and important concern noted in an analysis on chloropicrin (*TERA*, 2005) was the potential for effects on asthmatics. This concern is potentially also relevant for MITC since Russell and Rush (1996) only exposed eyes and excluded persons with symptoms of cold or allergy during the exposures, or who had recent asthma attacks. In addition, data of case reports from CDPR show some asthmatics with effects, in the absence of reported eye effects (see Table 9). Unfortunately, details in these cases are scant and actual or estimated exposure concentrations are not available. Thus, it is possible that these asthmatics were exposed to a concentration above that needed to evoke eye irritation, and that the expected eye irritation was not recorded.

Unfortunately, relatively few and inconsistent data are available in the literature on this issue and the relative sensitivity of asthmatics versus healthy individuals to the respiratory irritant effects of sensory irritants is not generally known. No respiratory effects were monitored in the Russell and Rush (1996) study. However, data from a review of the NO_2 literature (Dourson, unpublished observations) indicate that asthmatics are only about two-fold more sensitive than healthy individuals to respiratory effects at the lowest effect concentrations. In addition, the chloropicrin analysis of *TERA* (2005) indicated that respiratory effects only occurred at concentrations above the $BMCL_{10}$ for ocular irritation, thus ocular irritation is considered the more sensitive endpoint. Based in part on an evaluation of the *TERA* (2005) report, EPA concluded that a factor of 1 was appropriate for the intraspecies UF for chloropicrin. In reaching that conclusion, EPA evaluated the incident reports for chloropicrin, and determined that the data do not suggest that individuals with asthma are more sensitive to chloropicrin. For MITC, specifically, this also appears to be the case as shown in Table 6.

In light of the large differences exhibited between MITC NOAELs for eye irritation in humans and lung irritation in experimental animals (Table 5), and human incident reports that indicate a small difference between relative concentrations that cause eye and lung irritation (Figure 9), a

UF applied to the experimental animal NOAEL for lung irritation will not result in a lower safe concentration than that determined by eye irritation in humans. Thus, a UF applied to the effects in experimental animals for lung irritation does not result in a lower concentration than the choice of eye effects in humans as the basis for the health protective concentration after short-term exposure.

4.3 Health Protective Values

The best estimate of a health protective concentration for a four-hour exposure is 0.2. This is determined by dividing the average of the $BMCLs_{10}$ of either 0.20 or 0.22 ppm of the four-hour trial found in Table 4 by a UF of 1 for eye irritation, as discussed above. The best estimate of a health protective concentration for a 14-minute exposure is 0.8 ppm. This value is determined by dividing the average of the $BMCLs_{10}$ of either 0.83 or 0.78 ppm for the 14-minute trial found in Table 4 by an UF of 1, as discussed above.

The current assessment has considered the human data in sufficient depth that an UF can be derived based on the entirety of the data, and additional conservatism is unwarranted. The fact that Russell and Rush (1996) used sensitive individuals further supports a safe concentration of up to 0.2 ppm for four hours and up to 0.8 ppm for 14 minutes as health protective values.

TERA's judgment of a four-hour health protective value of 0.2 ppm is four-fold lower than that determined by the National Advisory Committee (NAC, 2008) for its Acute Exposure Guideline Levels (AEGL) of 0.8 ppm. However, our judgment of a 14-minute health protective value of 0.8 ppm is identical to NAC (2008) 10-minute value. In both cases, the Russell and Rush (1996) study formed the basis of the NAC evaluation and an UF of 1 was the collective best judgment.

5.0 ACKNOWLEDGEMENTS

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Appendix A: Acute 4 -Hour Inhalation Study with MITC in Rats (The Jackson Study) - Review prepared by Dr. Robert Thomassen (September 2008).

Summary

A BASF-sponsored acute 4-hour whole-body inhalation study with MITC was conducted in 1980 at the Huntington Research Center, Huntington, England. G C Jackson was the senior scientist associated with the study, hence the title. The purposes of the Jackson Study were probably to establish an LC_{50} for MITC via the inhalation route and to serve as a range finding study for a subsequent subchronic inhalation study with MITC. Fortuitously, the Jackson Study is also a highly informative dose-response study that has enabled the reviewer to draw a number of valid conclusions regarding the response of the eye and respiratory tract of the rat to a range of atmospheric concentrations of MITC from 93 to 541 ppm for periods as brief as 15 minutes to as long as 4 hours.

The Jackson Study was GLP compliant.

Seven groups of young Sprague-Dawley rats (5 males and 5 females / group) comprised the test population. Each group of ten animals was exposed whole body for 4 consecutive hours, group-by-group, to one of 7 concentrations (0, 282, 496, 570, 628, 786 or 1640 mg/m^3) of vaporous MITC in an inhalation chamber. Based upon the conversion factor of 1 mg/m^3 MITC = 0.33 ppm MITC, the MITC concentrations were 0, 93, 164, 188, 207, 259 and 541 ppm, respectively. During the exposure period, the rats were symptomatically evaluated at 0.25, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5 and 4.0 hours.

All rats in the 1640 mg/m^3 dose group died after 2 to 4 hours of exposure. An additional 14 males and 14 females in dose groups 496 through 786 mg/m^3 died during the first three days of the post-exposure observation period. There was no death at the 282 mg/m^3 dose level. The LC_{50} for MITC was determined to be 540 mg/m^3 or 178 ppm.

Under the conditions of this study, the rats displayed prompt, strong and initially highly uniform pharmacological responses to the full range of MITC concentrations tested beginning at 282 mg/m^3 (93 ppm). The rats also displayed toxicological signs that began later and weakly at 282 mg/m^3 but increased in variety and strength with increasing dose and length of exposure to MITC.

Pharmacological responses involved the eye (lacrimation and blepharospasm) and the nasal cavity (sneezing). Pharmacological responses such as lacrimation, blephoraspasm and sneezing occur in man and animals when xenobiotics interact with sensory nerve fibers in the cornea and the nasal mucosa. Such responses are referred to as peripheral sensory irritation effects or PSI effects. PSI effects are considered to be protective biological warning mechanisms to alert affected subjects to the presence of potentially harmful materials in the environment. Such effects are thus likely, if of sufficient potency, to cause the affected subjects to seek an uncontaminated area. To properly account for PSI effects seen in the Jackson Study, the reviewer coined the term PSIEL (Peripheral Sensory Irritation Exposure Level) to denote the dose level, or more commonly a range of dose levels, at which MITC caused pharmacological but not toxicological effects upon the eye and respiratory tract of the test animals.

Lacrimation was observed in all or nearly all rats exposed to MITC at 282, 496, 570 or 628 mg/m^3 for periods ranging from 0.25 to 4 hours. Lacrimation began to diminish at 0.25 hours at 786 mg/m^3 and disappeared entirely after 1.5 hours at that dose level. Since the loss of a protective physiological reflex such as lacrimation is clearly an adverse event in the life of a test subject, 786 mg/m^3 (259 ppm) for 2.0 hours was designated as the LOAEL for loss of the lacrimal reflex. On the other hand, a strong lacrimal reflex is evidence of a positive protective response to an irritant or a PSI effect; therefore, the PSIEL range was viewed to be 282 mg/m^3 (93 ppm) to 628 mg/m^3 (207 ppm) from 0.25 to 4 hours to 786 mg/m^3 (259 ppm) for 1.5 hours.

Blepharospasm was observed in all or nearly all rats exposed to MITC at 282, 496, 570 or 628 mg/m^3 for periods ranging from 0.25 to 4 hours. In addition, blepharospasm was present in 100% of the animals for almost half of the exposure period at 786 mg/m^3 but disappeared abruptly after 2.5 hours of exposure at that dose level. Since the loss of a protective physiological reflex such as blepharospasm is clearly an adverse event in the life of a test subject, 786 mg/m^3 (259 ppm) for 3.0 hours was designated as the LOAEL for loss of the blink reflex. On the

other hand, a strong blink reflex is evidence of a positive protective response to an irritant or a PSI effect; therefore, the PSIEL range was viewed to be 282 mg/m^3 (93 ppm) to 628 mg/m^3 (207 ppm) for 0.25 to 4 hours to 786 mg/m^3 (259 ppm) for 2.5 hours.

The data clearly show that a healthy intact eye and adnexa in a mammalian species, in this example the laboratory rat, serves as a *sensitive and resilient* sentinel or warning apparatus to the presence of MITC in the ambient air. The ocular apparatus alerted via strong chemosensory irritation responses manifested as lacrimation and blepharospasm at the lowest concentration tested (282 mg/m^3) (93 ppm) for 15 minutes or less. Based on the strength of the response there is no doubt that the ocular apparatus would alert to MITC concentrations below 282 mg/m^3. Moreover, the ocular apparatus was also resilient and continued to signal the presence of MITC at response rates of 60 to 100%, mostly 100%, for all exposure levels up to and including 628 mg/m^3 (207 ppm) MITC for 4 hours for lacrimation and to 786 mg/m^3 (259 ppm) for blepharospasm.

The data show that a healthy intact nasal mucosa in the laboratory rat also serves as sentinel or warning apparatus to the presence of MITC in the ambient air but not at the level of sensitivity and consistency as that demonstrated by the eye and adnexa. In this study, the nasal mucosa alerted via the involuntary response of sneezing at the next to lowest concentration of MITC (496 mg/m^3) for an exposure period of 15 minutes or less but only at a rate between 10 and 50%. The sneeze reflex disappeared at all dose levels after 0.5 to 1.5 hours of exposure. Based on these data, the PSIEL range for the sneeze reflex is viewed to be 496 mg/m^3 (164 ppm) for 1.0 hour up to and including 786 mg/m^3 (259 ppm) for 1.0 hour. The LOAEL for loss of the sneeze reflex was set at 496 mg/m^3 (164 ppm) for 1.5 hours.

Dyspnea and gasping were noted during the 4-hour exposure period also. The incidence of dyspnea was low and inconsistent. Any attempt to relate the observation to dose level and length of exposure appeared impractical and was not attempted. On the other hand, gasping showed a strong relationship between increased dose and shortened time to appearance (latency) by first being noted after 2.5 hours of exposure at 282 mg/m^3, next after 2.0 hours at 496 mg/m^3, then after 1.5 hours at 570 mg/m^3, etc., to being noted after only 1.0 hours of exposure at 786 mg/m^3. Based on these data the LOAEL for gasping was set at 282 mg/m^3 for 3.0 hours.

Rales are the only remaining clinical sign of significance. Rales were observed in all animals remaining alive on day one of the post-treatment observation period including animals at the 282 mg/m^3 dose level. Hence, the LOAEL for rales was set at 282 mg/m^3 (93 ppm).

All animals were necropsied. Based upon the results of the postmortem and microscopic examinations the following additional toxicological end points were assigned:

LOAEL for increased lung/body weight ratio - 496 mg/m^3 (164 ppm).

LOAEL for treatment-related macroscopic change in the lung - 496 mg/m^3 (164 ppm).

LOAEL for treatment-related microscopic change in the lung - 570 mg/m^3 (188 ppm).

Highlights

1) Exposure to MITC for 15 minutes, or less, at concentrations as low as 282 mg/m^3 (93 ppm) triggers lacrimation and blink reflexes in a manner consistent with peripheral sensory irritant effects (PSI) as described in the literature.

2) PSI mediated lacrimation and blepharospasm persist in a strong and resilient manner for as long as 4 hours of exposure at concentrations up to and including 628 mg/m^3 (207 ppm).

3) Exposure to MITC for 15 minutes or less triggers the sneezing reflex, again in a manner compatible with PSI effects, but at 496 mg/m^3 (164 ppm) or one dose level greater than that which triggers lacrimation and blepharospasm.

4) Exposure to MITC is associated with pathology within the respiratory tract including increased lung weights and gross and microscopic changes within the lung but at dose levels one (496 mg/m^3) (164 ppm) to two levels (570 mg/m^3) (188 ppm) greater than that which triggers lacrimation and blepharospasm.

A. Introduction

An acute 4-hour whole-body inhalation study with methyl isothiocyanate (MITC) was conducted in Sprague-Dawley rats at the Huntington Research Center, Huntington, England in 1980. BASF was the sponsor. The study is referred to as the Jackson Study. Graham C. Jackson was the Senior Scientific Officer, Department of Inhalation Toxicology at the time the study was conducted. The study was certified to be in compliance with the standards of Good Laboratory Practice (Gerald C. Clark, Head, Department of Inhalation Toxicology).

B. Materials and Methods

Seven groups of Sprague-Dawley rats (5 males and 5 females / group) comprised the test population. Each group of ten animals was exposed whole body for 4 consecutive hours, group-by-group, to one of 7 concentrations of vaporous MITC in an inhalation chamber.

The inhalation chamber was a transparent cubical structure with an internal volume of approximately 0.13 m³. The chamber exhausted through a pyramidal top. The volume of the chamber suggests that the inhalation compartment was approximately 0.5 m x 0.5 m x 0.5 m. The chamber was placed in an exhaust hood during the exposure period thereby providing negative relative pressure within the chamber. Chamber pressure was not monitored nor was humidity.

The temperature in the chamber was measured with a mercury bulb thermometer and recorded at 30 minute intervals during exposure. Mean in-chamber temperatures were reported as follows:

Table 1. Temperature of Chamber Air

Group	(mg/m³)	Temperature (ºC)
1	0	25.2 ± 0.59
2	786	25.0 ± 0.08
3	1640	23.8 ± 0.49
4	282	24.1 ± 0.49
5	496	24.2 ± 0.66
6	628	25.3 ± 0.77
7	570	24.3 ± 0.68

Gaseous MITC was generated from a solid 98% pure form of MITC (melting point 36ºC) by placing the generator vessel containing the MITC in a 40ºC water bath.

Five air samples were taken from the chamber during each exposure period and analyzed by gas chromatography to determine the concentration of MITC in the chamber atmosphere. The samples were drawn through a gas absorption trap (sintered glass type) containing 20 ml of acetone at a rate of 4 L per minute. The volume of the air sample was measured with a wet type gas meter. The results of the analyses appear in **Table 2.**

Table 2. Concentration of MITC in Chamber Air Samples

Group ID	Sample No.	Time Taken (hrs)	(minutes)	Concentration of MITC (g/m^3)
2	2.1	0	30	0.74
	2.2	0	56	0.84
	2.3	1	54	0.79
	2.4	2	57	0.79
	2.5	3	52	0.77
	Mean			0.786
	% variation			12.7
3	3.1	0	28	1.70
	3.2	1	01	1.60
	3.3	2	56	1.70
	3.4	2	43	1.60
	3.5	2	55	1.60
	Mean			1.64
	% variation			6.1
4	4.1	0	32	0.28
	4.2	1	02	0.27
	4.3	1	56	0.28
	4.4	3	02	0.30
	4.5	3	50	0.28
	Mean			0.282
	% variation			10.6
5	5.1	0	29	0.47
	5.2	0	58	0.49
	5.3	2	03	0.51
	5.4	3	02	0.50
	5.5	3	51	0.51
	Mean			0.496
	% variation			8.1
6	6.1	0	31	0.59
	6.2	0	54	0.60
	6.3	1	59	0.63
	6.4	3	03	0.66
	6.5	3	50	0.66
	Mean			0.628
	% variation			11.1
7	7.1	0	25	0.56
	7.2	1	02	0.58
	7.3	2	00	0.57
	7.4	2	51	0.56
	7.5	3	55	0.58
	Mean			0.570
	% variation			3.5

The exposures were conducted on a group-by-group basis at selected concentrations of MITC over a period of several days to establish an LC_{50} exposure level.

Rats that survived the 4-hour exposure period were observed for 14 days post-exposure to provide a final death tally and to document the progression and/or remission of signs that had developed during exposure and also to document the development of possible latent post-exposure effects.

Table 3 shows the mortality rate by group by increasing concentration of MITC.

In the report, MITC concentrations are expressed in g/m³. However, to correlate the exposure levels in this acute study to the levels used in the follow-up BASF subchroinc study and reported as mg/m³ and in the Russell and Rush human eye irritation study and reported as mg/m³ and ppm, the exposures in this review are expressed in mg/m³ and ppm also.

The conversion factors are: 1 ppm MITC = 2.99 mg/m³ MITC or 1 mg/m³ MITC = 0.33 ppm MITC.

Table 3. Mortality by Dose

	MITC			Deaths	
Group	(g/m³)	(mg/m³)	(ppm)	Male	Female
1	0	0	0	0/5	0/5
4	0.282	282	93	0/5	0/5
5	0.496	496	164	1/5	1/5
7	0.570	570	188	3/5	3/5
6	0.628	628	207	5/5	5/5
2	0.786	786	259	5/5	5/5
3	1.64	1640	541	5/5	5/5

Based upon the above data, the LC_{50} was established at 0.54 g/m³ ± 0.015 g/m³ or 540 mg/m³ or 178 ppm.

Table 4 shows the time of death (found dead/euthanatized) for animals dead during exposure and dead during the post-exposure observation period.

Table 4. Time of Death

During Exposure									
Dose	(hrs)								
(mg/m^3)	0.25	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4
0									
282									
496									

570					
628					
786					
1640			1m	4m	
				2f	3f

Post-Exposure Dose (mg/m^3)	0	1.0	(days) 2.0		3.0
0					
282					
496		1f	1m		
570			2m		1m
	1f	1f	1f		
628	1m	2m	2m		
	2f	3f			
786	1m	4m			
		1f	4f		
1640					

C. Clinical Observations during the 4-Hour Exposure Period

The demeanor of the control rats (air only) was unremarkable during the entire exposure period indicating that, absent any additional information, the chamber conditions in and of themselves were not harmful to the rats and that the clinical observations made during the exposure period were due to introduction of MITC into the chamber.

Table 5 shows clinical signs related to the ocular and respiratory systems only. Since signs were recorded without regard to individual animal number, or sex, the results are reported only by group; that is, 10 animals.

1. Signs and definitions

a. Lacrimation: an excess of tears, tearing, watery eye.

In this study, the probable reason for excessive tearing is increased tear production in response to irritation of the cornea, conjunctiva and/or lacrimal gland by MITC; that is, reflex tears. Irritation of the nasal mucosa may also result in reflex tears.

Apparent excessive tearing also may be due to an accumulation of lacrimal fluid in and around the eye due to reduced flow of tears from the lacrimal sac into the nose by way of the nasolacrimal duct – a condition known clinically as epiphora. Since rats are obligate nose breathers, it is possible that passage of MITC through the nasal cavity may result in an inflammatory response, including edema, sufficient to interfere, to some degree, with drainage of tears. However, since the clinical observation of lacrimation was seen immediately upon exposure (**Table 5)** and not seen at any time during the 14-day post-exposure period, including immediately post-exposure (**Table 11),** the conclusion is that the excessive tearing was reflexive in origin and not the result of swelling within the nasal mucosa or nasolacrimal duct that would take a period of time to develop and resolve.

The question as to whether or not excessive tearing was due to reflexive stimulation of the nasal mucosa appears to be answered by data contained in the Rosskamp Report, a report of a nose only subchronic inhalation study with MITC. With the exception of one report of epiphora, no excessive tearing or lacrimation was observed throughout the 12 to 13 week exposure period.

Conclusion: lacrimation as reported in the Jackson Study is the result of reflex stimulation of the cornea, conjunctiva and/or lacrimal gland by MITC.

b. Eyes closed or partially closed: an observation that should be taken at face value and interpreted as full or partial covering of the surface of the eye by the upper and lower eyelids. This condition is commonly referred to blepharospasm.

Blepharospasm is probably the result of an involuntary reflex; that is, a manifestation of the corneal reflex (contraction of the eyelids when the cornea is lightly touched) or possibly a voluntary reflex on the part of the test animal in an attempt to deal with ocular discomfort and pain.

Alternately, the partial or complete closure could be due to varying degrees of edematous swelling of the eyelids. However, the swelling would require an interval of time to develop and to resolve. Since eyes closed or partially closed was observed immediately during the first quarter hour of exposure and disappeared immediately during the first post-exposure observation period, the conclusion is that eyes closed or partially closed is a reflexive response to irritation by MITC.

c. Sneezing: a reflexive action to expel air from the nose and mouth by involuntary spasmodic contraction of the muscles of expiration.

In this study, sneezing is probably the result of MITC irritating the afferent sensory lining of the nose; more specifically, the solitary chemosensory cells located in the anterior respiratory epithelium of the nasal cavity of rodents.

d. Dyspnea: breathlessness, difficult breathing, shortness of breath.

In an acute study, dyspnea may be caused by acute sensory effects such as pain or rapidly deployed physiological responses such as contraction of smooth muscle anywhere along the respiratory pathway; for example, broncho- or bronchiolarspasm. In the somewhat longer term, dyspnea could be due to loss of functional lung volume due to intra-alveolar edema.

e. Gasping: 1) to draw in breath sharply or with difficulty, 2) to breathe convulsively or laboriously.

In an acute study, gasping suggests the development of a degree of pulmonary dysfunction sufficient to put the animal at some degree of respiratory deficit.

2. Tables

The group incidence of all clinical observations is displayed by exposure time and dose in **Table 5**.

To assure that the signs were evaluated in a complete and thorough manner, the dose/duration-of-exposure relationship for each sign is examined individually in **Tables 6 – 10**.

Table 5. Clinical Signs Observed During the Exposure Period - Ocular and Respiratory Systems Only

Dose (mg/m^3)	(ppm)	Number of rats showing sign(s) in time (hrs) of exposure								
Clinical Sign		0.25	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
0	0									
Unremarkable		10	10	10	10	10	10	10	10	10
282	93									
Eye										
Lacrimation		10	10	10	10	10	10	10	10	10
Blepharospasm		10	10	10	10	10	10	10	10	10
Respiratory										
Sneezing					1					
Dyspnea		1	2	2			2	3	3	1
Gasping								2	1	3
Dead										
496	164									
Eye										
Lacrimation		10	10	10	9	9	10	8	6	6
Blepharospasm		10	10	10	10	10	10	10	8	7
Respiratory										
Sneezing		2	2	1						
Dyspnea						2	2	2	3	2
Gasping							3	4	5	6
Dead										
570	188									
Eye										
Lacrimation		10	10	10	10	10	10	8	8	6
Blepharospasm		10	10	10	10	10	10	10	10	10
Respiratory										
Sneezing		2	1							
Dyspnea					2		1			
Gasping						5	3	3	4	4
Dead										
628	207									
Eye										
Lacrimation		10	10	10	10	10	10	9	9	9
Blepharospasm		10	10	10	10	9	8	8	8	7
Respiratory										
Sneezing		5	3	1	1					
Dyspnea								1	2	3
Gasping							3	5	6	9
Dead										
786	259									
Eye										

	Lacrimation			6	10	4	3			
	Blepharospasm			10	10	10	10	10	10	
	Respiratory									
	Sneezing			5	2					
	Dyspnea			5						
	Gasping					2	3	4	4	7	9
	Dead									
1640541										
	Eye									
	Lacrimation			10	10	10	10	9	3	
	Blepharospasm			10	10	10	10	10		
	Respiratory									
	Sneezing			5						
	Dyspnea			3	4					
	Gasping					10	9	3		
	Dead								1	7	10

Table 6. Lacrimation

Exposure Time (hrs)			Dose (mg/m^3) 282	496	570	628	786	1640		
0.25			10	10	10	10	6	10		
0.5			10	10	10	10	10	10		
1.0			10	10	10	10	4	10		
1.5			10	9	10	10	3	10		
2.0			10	9	10	10		9*		
2.5			10	10	10	10		3**		3.0
	10	8	8	9		***			3.5	
10	6	8	9		***					
4.0			10	6	6	9		***		

*1 dead @ this time **7 dead @ this time ***10 dead @ this time

Table 7. Blepharospasm

Exposure Time (hrs)			Dose (mg/m^3) 282	496	570	628	786	1640		
0.25			10	10	10	10	10	10		
0.50			10	10	10	10	10	10		
1.0			10	10	10	10	10	10		
1.5			10	10	10	10	10	10		
2.0			10	10	10	9	10	*		2.5
	10	10	10	8	10	**			3.0	
10	10	10	10		***			3.5		10
8	10	10		***						
4.0			10	7	10	7		***		

*1 dead @ this time **7 dead @ this time ***10 dead @ this time

Table 8. Sneezing

Exposure Time (hrs)	Dose (mg/m^3) 282	496	570	628	786	1640		
0.25		2	2	5		5		
0.5		2	1	3	5			
1.0		1		1	2			
1.5	1			1				
2.0						*		2.5
				**			3.0	
		***			3.5			
	***			4.0				
***								

*1 dead @ this time **7 dead @ this time ***10 dead @ this time

Table 9. Dyspnea

Exposure Time (hrs)	Dose (mg/m^3) 282	496	570	628	786	1640		
0.25	1							
0.5	2				5	3		
1.0	2					4		
1.5			2					
2.0		2				*		2.5
2	2	1		**			3.0	
3	2	1		***		3.5		2
3	2		***					
4.0	1	3		3		***		

*1 dead @ this time **7 dead @ this time ***10 dead @ this time

Table 10. Gasping

Exposure Time (hrs)	Dose (mg/m^3) 282	496	570	628	786	1640
0.25						
0.50						
1.00						
1.5					2	10

2.0					5		3	9*		2.5
		3	3	3	4	3**			3.0	
2	4	3	5	4	***			3.5		1
5	4	6	7	***						
4.0			3	6	4	9	9	***		

*1 dead @ this time **7 dead @ this time ***10 dead @ this time

---

C. Clinical Observations during the 14-Day Post-Exposure Observation Period

The control rats were normal in appearance and behavior during the 14-day post-exposure observation period.

Table 11 shows clinical signs related to the eye and respiratory tract only. As in **Table 5**, the signs are reported by group only.

1. Signs and definitions

a. Ocular opacity: corneal opacity, loss of corneal transparency.

In the setting of an acute study, loss of corneal transparency may be due to structural damage to the cornea or less severe change such as swelling due to edema. Since ocular opacity disappeared quickly in the post-exposure period and was not seen in any animal or group after Day 2 the opacity was probably due to transient corneal edema.

b. Eyes red rimmed/exophthalmus: red rim indicates inflammation of the margin of the lid(s)
(blepharitis). Exophthalmus(os) indicates protrusion of the eyeball to some degree.

Eyes red rimmed/exophthalmus was seen in one animal only and only on post-exposure Day 0.

c. Dyspnea: See **Section C** above.

d. Gasping: See **Section C** above.

e. Rales: a somewhat nonspecific term for lung sounds heard on auscultation; however, rales are generally thought of as clicking, rattling or crackling noises caused by the rapid opening of small air ways and alveoli temporarily closed by fluid such as edema or exudate.

In the setting of clinical examination of rats and mice, the observation of rales is usually based upon the sense of sounds heard by the unaided ear or felt when handling the animal.

The clinical signs of lacrimation and blepharospasm observed during the exposure period were not observed during the post-exposure observation period.

Table 11. Clinical Signs Observed During the 14-Day Post-Exposure Observation Period -

Eye and Respiratory Tract

Dose	Number of rats (males & females) showing sign(s) on day(s) **indicated**														
(mg/m^3)	Clinical Sign														
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
0	Unremarkable														
282															
Eye															
Ocular															
Opacity															
Respiratory															
Dyspnea															
Gasping															
Rales															
	10						7	7	5						
Dead															
Alive															
10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
496															
Eye															
Ocular															
Opacity															
	4														
Respiratory															
Dyspnea															
Gasping															
	5														
Rales															
	10	8	8	8				4							
Dead															
	1	2													
Alive															
10	9	8	8	8	8	8	8	8	8	8	8	8	8	8	

Dose	Number of rats (males & females) showing sign(s) on day(s) **indicated**														
(mg/m^3)	Clinical Sign														
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
570															
Eye															
Ocular															
Opacity															
Red rim/Exophthalmos															
1															
Respiratory															
Dyspnea															
Gasping															
			1												
Rales															
	9	6	3	2											
Dead															
1	2	5	6												
Alive															

10 8 5 4 4 4 4 4 4 4 4 4 4 4 4

628
Eye
Ocular
Opacity
8
Respiratory
Dyspnea
Gasping
8 4
Rales
8
Dead
3 8 10
Alive
9 2 0 0 0 0 0 0 0 0 0 0 0 0 0

786
Eye
Ocular
Opacity
9 1
Respiratory
Dyspnea
9
Gasping
9 9 1
Rales
0 9 1
Dead
1 6 10
Alive
9 4 0 0 0 0 0 0 0 0 0 0 0 0 0

1640
Dead All rats died during exposure

D. Lung Weights:

Table 12. Lung to Bodyweight Ratio – Male and Female

Dose		(LW ÷ BW x 100)			(LW ÷ BW x 100)	
(mg/m$^{3)}$	Sex	Survivor	Decedent	Sex	Survivor	Decedent
0	Male	0.47		Female	0.55	
		0.39			0.57	
		0.42			0.58	
		0.44			0.50	
		0.40			0.51	
	Mean	0.42			0.54	
	SD	0.032			0.036	
282		0.61			0.59	
		0.52			0.52	
		0.52			0.62	
		0.56			0.54	
		0.50			0.51	
	Mean	0.54			0.56	
	SD	0.044			0.047	

496		0.43	1.35	0.53	1.04
		0.46		0.63	
		0.43		0.60	
		0.55		0.51	
	Mean	0.47		0.57	
	SD	0.057		0.057	
570		0.45	1.19	0.48	1.31
		0.49	0.95	0.54	0.79
			1.04		0.96
	Mean	0.47	0.99	0.51	0.77
	SD	0.028	0.129	0.042	0.306
628		0.80			0.97
		1.15			0.60
		1.26			1.01
		1.18			0.84
		1.55			0.75
	Mean	1.19			0.83
	SD	0.268			0.167
786		1.19			1.10
		1.51			1.33
		1.34			1.06
		0.73			1.30
		1.54			0.90
	Mean	1.26			1.14
	SD	0.329			0.178
1640		0.80			0.87
		0.75			0.80
		0.77			0.75
		0.75			0.88
		0.81			0.88
	Mean	0.78			0.84
	SD	0.028			0.059

E. Macroscopic Observations:

1. Terms and definitions

a. Congestion: reddening of cut and/or pleural surfaces of the lung.

b. Swollen appearance: swollen with a dry appearance suggests emphysema. Swollen with
a moist appearance suggests edema.

c. Edema: lungs that are swollen, firm and moist (watery) would indicate the presence of edema.

d. Red hepatization: hepatization connotes consolidation of lung tissue into a liver-like state. The early stage, in which pulmonary exudates are blood-stained, is called red hepatization. Hepatization generally indicates the presence of pneumonia.

e. Dark/red depressed areas: suggests focal hemorrhage, consolidation or pneumonitis.

Table 13 contains gross observations for the lungs only. There were no gross observations for the eyes.

The lung/body weight ratios have been carried over from **Table 12** to quantify, in a way, the difference in pulmonary effects between survivors and decedents at the various dosages. The ratios for the 1640 mg/m^3 group are of particular interest.

Table 13. Apparent Treatment-Related Macroscopic Findings - Lungs

Dose (mg/m^3)	Sex: Observation	Male Survivor	Male Decedent	Female Survivor	Female Decedent
0	Number of rats	5		5	
	No treatment related finding	5		5	
	Mean lung/ body weight ratio	0.42		0.51	
282	Number of rats	5		5	
	No treatment-related finding	4		5	
	Swollen appearance	+			
	Mean lung/body weight ratio	0.54		0.56	
496	Number of rats	4	1	4	1
	No treatment-related finding	3		3	
	Congestion		+	+	+
	Swollen appearance				
	Edema				
	Red hepatization		+		+
	Dark/red depressed areas	+			
	Mean lung/body weight ratio	0.47	1.35	0.57	1.04
570	Number of rats	2	3	2	3
	No treatment-related finding	2		2	
	Congestion		+		+++
	Swollen appearance		++		
	Edema				
	Red hepatization		++		++
	Dark/red depressed areas				
	Mean lung/body weight ratio	0.47	0.99	0.51	0.77
628	Number of rats		5		5
	No treatment-related finding		0		0
	Congestion		++		++
	Swollen appearance		++		++
	Edema		+++		
	Red hepatization		++++		++++
	Dark/red depressed areas		++++		++

	Mean lung/body weight ratio	1.19	0.83
786	Number of rats	5	5
	No treatment-related finding	0	0
	Congestion	+++++	+++
	Swollen appearance		
	Edema	+	
	Red hepatization	++	++++
	Dark/red depressed areas	+	+
	Mean lung/body weight ratio	1.26	1.14
1640	Number of rats	5	5
	No treatment-related finding	1	0
	Congestion	++	+++++
	Swollen appearance		
	Edema	++	
	Red hepatization		
	Dark depressed areas	+	
	Mean lung/body weight ratio	0.78	0.84

F. Microscopic Findings:

Table 14 contains observations for the lungs only. The eyes were not collected for microscopic examination.

Table 14. Apparent Treatment-Related Microscopic Findings - Lungs

Dose	Sex:	Male		Female	
(mg/m^3)	Observation	Survivor	Decedent	Survivor	Decedent
0	Number of rats examined	5		5	
	Number without treatment-related finding	5		5	
282	Number of rats examined	5		5	
	Number without treatment-related finding	5		5	
496	Number of rats	4	1	4	1
	Number without treatment-related finding	4		4	
	Congestion		+		+
570	Number of rats	2	3	2	3
	Number without treatment-related finding			2	
	Congestion		+		+
	Perivascular and per-ibronchiolar edema with associated inflammatory		+		
	cell infiltration				
	Focal acute bronchiolitis		+		

	Disorganization and mitotic activity or dedifferentiation of the bronchiolar epithelium	++	
	Perivascular and peribronchiolar edema	+	+
	Aggregates of macrophages in terminal bronchioles, alveoli or in perivascular tissue ++	+	
	Focal pneumonitis with associated alveolar macrophages		+
628	Number of rats examined	5	5
	Number without treatment-related finding	0	0
	Congestion	+++	+++
	Perivascular and peribronchiolar edema with associated inflammatory cell infiltration	++++	+++
	Intra-alveolar hemorrhage with eosinophilic alveolar macrophages and partial collapse of the lobe	+	
	Focal intra-alveolar edema	+	
	Focal acute bronchiolitis	++	
	Focal necrotizing bronchitis with associated pneumonitis	+	
	Areas of interstitial pneumonitis		+
	Area of intra-alveolar hemorrhage	+	+
	Perivascular and peribronchiolar edema		+
786	Number of rats	5	5
	No report of microscopic findings		
1640	Number of rats	5	5
	No report of microscopic findings		

G. Discussion

Although not stated in the report it is reasonable to think that the Jackson Study was conducted with two goals in mind: 1) to establish an acute LC_{50} for MITC via the inhalation route and 2) to serve as a range-finding study upon which to base a selection of doses for a subsequent subchronic inhalation study with MITC. Fortuitously, the Jackson Study is also a highly informative dose-response study by nature of its design and the manner in which the test animals responded to a range of exposure levels and exposure periods to MITC.

The gradual step-wise increase in exposure concentrations between 282 mg/m^3 and 786 mg/m^3 (282 x 1.76 = 496, 496 x 1.15 = 570, 570 x 1.10 = 628 and 628 x 1.26 = 786) provided a platform for graduated response on the part of the test subjects to MITC. In this scheme, the high dose level of 1640 mg/m^3 has the characteristics of an outlier for the following reasons: 1)

1640mg/m^3 was no doubt intentionally chosen to be a lethal dose (all 10 animals died quickly during the exposure period), 2) the increase from 786 mg/m^3 to1640 mg/m^3 more than doubled the concentration of MITC (1640 ÷ 786 = 2.09) between the doses and 3) lung/body weight ratios are significantly lower at 1640 mg/m^3 than in animals dying at lower dosages indicating that pulmonary pathology may have played less a role in deaths of animals at 1640 mg/m^3 than in animals dying at a lower dose of MITC. For these reasons, the1640 mg/m^3 group is excluded from the discussion of apparent dose-related pharmacological and toxicological effects of MITC on the eyes and respiratory tract.

1. Ocular Effects

Lacrimation and blepharospasm should be considered as nothing other than positive healthy responses on the part of the eye and adnexa to an irritant.

Data in **Tables 5, 6 and 7** show that lacrimation and blepharospasm eye were triggered by 15 minutes or less exposure to MITC at a concentration of 282 mg/m^3 (93 ppm) and that the responses persist in a highly uniform manner through 4 hours of exposure up to and including a dose level of 628 mg/m^3 (207 ppm).

Additionally, data in **Tables 5, 6 and 7** clearly demonstrate that, again in the context of this study, the positive healthy reflexive responses of lacrimation and blepharospasm begin to fade during 4-hours of exposure to MITC at the 786 mg/m^3 (259 ppm) dose level and are totally ablated after 1.5 hours for lacrimation and 2.5 hours for eye closed/partially closed. This weakening and eventual loss of a beneficial reflexive response is the only MITC-exposure related observation for the eye that could be considered a toxicological event or endpoint.

As to the incidence of response (number of responders ÷ number of exposed x 100) for lacrimation, the response is nearly 100 % through 2.5 hours of exposure through the 628 mg/m^3 (207 ppm) dose level and 85 % through 4 hours of exposure through the 628mg/m^3 dose level thus indicating a high and uniform level of response for lacrimation.

As to the incidence of response for blepharospasm eye closed/partially closed, the response is again nearly 100 % through 3.5 hours of exposure through the 628 mg/m^3 (207 ppm) dose level and 87 % through 4 hours of exposure through the 628 mg/m^3 dose level, again indicating a high and uniform level of response for blepharospasm.

Overall, the data show that a healthy intact eye and adnexa in a mammalian species, in this example the laboratory rat, serves as a *sensitive and resilient* sentinel or warning apparatus to atmospheric concentration of MITC beginning as low as 282 mg/m^3 (93 ppm) (and most certainly lower) for 15 minutes or less of exposure and as high as 628 mg/m^3 (207 ppm) with a response rate of no less than 85 % and most frequently at a response rate of 100 %.

Table 11 shows that the only recorded physical effect of MITC upon the eye *per se* is ocular opacity observed early in the post-exposure observation period (Day 1) in the following manner: none at 282 mg/m^3 (93 ppm), 4 animals at 496 mg/m^3 (164 ppm), none at 570 mg/m^3 (188 ppm), 8 animals at 628 mg/m^3 (207 ppm) and 9 animals at 786 mg/m^3 (259 ppm). In that

none of the affected rats at 628 and 786 mg/m^3 survived more than a day or two post-exposure and that the observation was highly inconsistent at lower doses make it difficult to speculate upon the nature and significance of ocular opacity other than to know that it was an observation that appeared only in the post-exposure observation period and disappeared after one day in survivors. Most likely the cause of ocular opacity is corneal edema. The reason for the inconsistency of the observation is not known.

2. Pulmonary Effects

a. Nasal Cavity

The data in **Tables 5 and 8** indicate that exposure to MITC at doses of 496 mg/m^3 (164 ppm) and higher for 0.25 hours or more induces an erratic pattern of the sneezing (the one observation of sneezing at 1.5 hours at 282 mg/m^3 (93 ppm)is discounted as being meaningless as a dose-response setting). The data also suggest that adaptation to the stimulus that invokes sneezing sets in after 0.5 to 1.5 hours of exposure at any dose level.

As with lacrimation and blepharospasm, sneezing should be considered a positive healthy response on the part of the test subject to perhaps rid the nasal cavity of an irritating substance. Adaptation appears to set in after 0.5 to 1.5 hours of exposure at any dose.

As to the incidence of response for sneezing, the rate of response is much lower and far less uniform than the response incidence for lacrimation or blepharospasm in that the overall incidence is 12% with a range of 10 to 50% through 1.5 hours of exposure up to a dose level of 786 mg/m^3 (259 ppm).

Overall, the data show that a healthy intact nasal mucosa in a mammalian test system, such as the laboratory rat, will alert to the presence of atmospheric MITC but not at the level of sensitivity or consistency as exhibited by the eye.

b. Lungs

The clinical, potentially pathological and pathological response of the lung to exposure various concentrations of MITC for up to 4 hours may be assessed from **Tables 5, 9, 10, 11, 12, 13 and 14.**

Tables 5 and 9 show that the clinical observation for dyspnea is highly inconsistent and lacks a clear dose-response pattern.

On the other hand, **Tables 5 and 10** show a remarkably strong dose response for the clinical observation gasping. The data indicate that disturbed pulmonary physiology sets in at a dose level of 282 mg/m^3 (93 ppm) but that the disturbance requires an exposure of at least 2.5 hours to be reported as a sign at 3.0 hours. From that point on, gasping continues to develop in a clear dose-response manner through 786 mg/m^3 (259 ppm) whereat the response appears to require at least 1 hour of exposure to MITC.

Table 11 shows that rales were observed at all dose levels on Day 1 post-exposure.

Table 12 shows a lung/body weight ratio increase at 496 mg/m^3 (164 ppm) and above.

Table 13 shows apparent treatment-related macroscopic change in the lung beginning at 496 mg/m^3 (164 ppm). The single observation of swollen appearance in one animal in the 282 mg/m^3 group is discounted as a significant dose-setting observation.

Table 14 shows apparent treatment-related microscopic change in the lung beginning at 570 mg/m^3 (188 ppm). The observation of congestion is discounted as a significant dose-setting observation.

H. Conclusions

1. Definitions

Traditionally, differentiation between adverse and non-adverse effects in toxicology studies is based upon definitions such as found in the *European Centre for Ecotoxicology and Toxicology of Chemicals Technical Report No 85* (Brussels, December 2002) cited below.

a. Non-adverse effect: *those biological effects that do not cause biochemical, behavioural, morphological or physiological changes that affect the general well-being, growth, development or life span of an animal.*

b. Adverse effect: *a biochemical, behavioural, morphological or physiological change (in response to a stimulus) that either singly or in combination adversely affects the performance of the whole organism or reduces the organism's ability to respond to an additional environmental challenge.*

c. NOEL: *the highest exposure level at which there are no effects (adverse or non-adverse) observed in the exposed population, when compared with its appropriate control.*

d. NOAEL: *the highest exposure level at which there are no statistically or biologically significant increases in the frequency or severity of adverse effects between the exposure population and its appropriate control. Some effects may be produced at this level, but they are not considered to be adverse or precursors to adverse effects.*

e. LOAEL: *the lowest exposure level at which there are statistically or biologically significant increase in the frequency or severity of adverse effects between the exposed population and its appropriate control group.*

However, traditional definitions fail to account for responses that are not only biologically non-adverse but are in fact pharmacologically beneficial reflexes on the part of an organ to protect the entire organism.

B Ballantyne discusses this type of response at length (*Inhalation Toxicology, edited by H Salem and S Katz, 2006, CRC Press, Chapter 13: Peripheral Chemosensory Irritation with Particular Reference* to *Respiratory Tract Exposure, pp 269-306*).

The following is extracted from paragraph **13.1 Nature of the Peripheral Sensory Irritant Effect** (p 270).

"Peripheral sensory irritation (PSI) is a pharmacological effect in which xenobiotics interact with sensory nerve receptors in the skin or mucosae to produce a local sensation (discomfort, itching, burning sensation, or pain) together with related local and some systemic (autonomic) reflexes. The effects subside after removal of the stimulus and do not result in long-term adverse sequelae. Hence, the major characteristics of a PSI event are that the materials act locally (in skin or mucosae) by stimulating sensory nerve receptors and producing local sensations with locally mediated and some systemic reflexes (Ballantyne, 1999). Many substances causing a pharmacological PSI effect will also produce, usually at a higher applied concentration, an inflammatory response. Thus, a PSI effect may result in a protective biological warning of exposure to potentially harmful materials. Originally, PSI effects were attributed to a common chemical sense independent of touch, temperature, and pain (Parker, 1912). However, it was subsequently demonstrated that PSI effects are mediated by several types of receptors, most of which also respond to noxious, thermal, and/or mechanical stimuli (Green, 2000). Thus the idea of common chemical sense was replaced by the concept of that PSI effects are mediated principally by chemically sensitive neural elements of pain and temperature; i.e., a process of chemosensory irritation (PCI). The word 'chemestheses' was introduced to stress that chemosensory irritation is a multimodal sense (Green et al., 1990)"

Based upon the above, the author has coined the term **Peripheral Sensory Irritation Effect Level** or **PSIEL** to describe the level, or more realistically the range of concentrations at which a irritant, in this case MITC, causes a chemesthetic type response upon the part of an organ or organ system.

Application of the above definitions to data contained within the Jackson Report results in the following pharmacological and toxicological effect levels in young male and female Sprague-Dawley rats exposed whole body for 4 consecutive hours group-by-group to 0, 282, 496, 570, 628, 786 or 1640 mg/m of vaporous MITC in an inhalation chamber. The endpoints are listed by a. clinical sign, b. necropsy finding, c. organ weight, and d. microscopic finding.

a. Clinical signs

Eye

PSIEL range for lacrimation - 282 mg/m^3 (93 ppm) to 628 mg/m^3 (207 ppm) from 0.25 to 4 hours to 786 mg/m^3 (259 ppm) for 1.5 hours.

LOAEL for loss of the lacrimal reflex - 786 mg/m^3 (259 ppm) for 2.0 hours.

PSIEL range for blepharospasm - 282 mg/m^3 (93 ppm) to 628 mg/m^3 (207 ppm) for 0.25 to 4 hours to 786 mg/m^3 (259 ppm) for 2.5 hours.

LOAEL for loss of the blink reflex - 786 mg/m^3 (259 ppm) for 3.0 hours.

Respiratory tract

PSIEL range for the sneeze reflex - 496mg/m^3 (164 ppm) for 1.0 hour up to and including 786 mg/m^3 (259 ppm) for 1.0 hour.

LOAEL for loss of the sneeze reflex - 496 mg/m^3 (164 ppm) for 1.5 hours.

LOAEL for gasping – 282 mg/m^3 (93 ppm) for 3.0 hours.
LOAEL for rales - 282 mg/m^3 (93 ppm).

b. Organ weights

LOAEL for increased lung/body weight ratio - 496 mg/m^3 (164 ppm).

c. Necropsy findings

LOAEL for treatment-related macroscopic change in the lung - 496 mg/m^3 (164 ppm).

d. Microscopic findings

LOAEL for treatment-related microscopic change in the lung - 570 mg/m^3 (188 ppm).

-End-

Written by:
Robert W Thomassen, DVM
Diplomate, The American College of Veterinary Pathologists (Emeritus)
09/14/2008

Appendix B: Subchronic 4-Week Whole-Body Inhalation Study with MITC in the Rat (The Klimisch Study) with Emphasis on the Pharmacological and Toxicological Effects of MITC on the Eye and Respiratory Tract. Review prepared by Dr. Robert Thomassen (September 2008)

Summary

A subchronic 4-week whole-body inhalation study with MITC was conducted in 1985 at the BASF laboratories in Germany. H J Klimisch was the study director, hence the title. The study was conducted under OECD guidelines and perhaps is GLP-compliant as well. The latter point is not clear in the English translation.

Four groups of Wistar rats (5 males and 5 females / group) comprised the test population. Each group of ten animals was exposed whole body for 6 hours a day for 20 days (8 days on, 2 days off, 10 days on, 2 days off and 2 day on) (120 hours) to one of 4 concentrations (0, 5, 20 or 100 mg/m^3) of vaporous MITC in an inhalation chamber.

Based upon the conversion factor of 1 mg/m³ MITC = 0.33 ppm MITC, the MITC concentrations in the Klimisch Study were 0, 1.6, 6.6 and 33 ppm for 5, 20 and 100 mg/m^3 dose levels, respectively.

There were no lethalities.

Exposure to MITC produced toxicological effects in the respiratory tract (nasal cavity, trachea and lung) at the 100 mg/m^3 (33 ppm) dose level only. Therefore, the LOAEL was 100 mg/m^3 (33 ppm), the NOAEL was 20 mg/m^3 (6.6 ppm) and the NOEL was 5 mg/m^3 (1.6 ppm) for the respiratory tract.

While there were no MITC-related toxicological effects on the eye at any dose level, the eye did respond pharmacologically to MITC at dose levels of 20 and 100 mg/m^3 via a local reflex mechanism that resulted in closure of the eyelids (blepharospasm) at 20 mg/m^3 (6.6 ppm) and blepharospasm and discharge from the eyes (lacrimation) at 100 mg/m^3 (33 ppm).

Pharmacological responses of this nature occur in man and animals when xenobiotics interact with sensory nerve fibers in the skin, cornea or respiratory tract mucosa and are referred to as peripheral sensory irritation effects or PSI effects. PSI effects are considered to be protective biological warning mechanisms to alert affected subjects to the presence of potentially harmful materials in the environment. Such effects are thus likely, if of sufficient potency, to cause the affected subjects to seek an uncontaminated area.

In this study, blepharospasm was the alerting event pharmacologically triggered at 20 mg/m^3 perhaps on or shortly after the first day of exposure. Based upon the post mortem and microscopic findings it is clear that a MITC exposure level greater than the alerting dose level of

20 mg/m^3 was required to cause toxicological effects in the nasal cavity, trachea or lungs. In other words, the protective intent of a PSI effect would have been fulfilled had the test subjects been able to seek out an uncontaminated area.

A. Introduction

A subchronic 4-week whole-body inhalation study with methyl isothiocyanate (MITC) was conducted in Wistar rats at the BASF Aktiengesellschaft, Ludswigshafen/Rein, FRG in 1985. BASF was the sponsor.

The study is referred to as the Klimisch Study. H. J. Klimisch was the study director. The original report in German was released in 1987. U. Nűssler translated the report to English.

The study was carried out on the basis of OECD Guidelines (Method 412). The study may also be in compliance with the standards of Good Laboratory Practice although that is not absolutely clear in the translation.

B. Materials and Methods

Four groups of Wistar rats (5 males and 5 females / group) comprised the test population. Each group of ten animals was exposed whole body for 6 hours a day for 20 days (120 hours) to one of 4 concentrations (0, 5, 20 or 100 mg/m^3) of vaporous MITC in an inhalation chamber. **Table 2** shows the sequence of exposure days. It should be noted that the exposure was not 5 days on and 2 days off but 8 days on, 2 days off, 10 days on, 2 days off, and 2 days on.

The inhalation chamber was of glass and steel construction with a volume of about 500 L. The chamber exhausted through an exhaust air system.

The test substance was gaseous MITC generated from a solid 96.9% pure form of MITC by placing the generator vessel containing the MITC in water baths at 39.7, 41.0 and 42.8ºC, for the 5, 20 and 100 mg/m^3 groups, respectively, (there is no explanation as to why the water bath temperatures were not the same for all groups) and delivered to the inhalation chamber by nitrogen flowing at the rates of 0.28, 1.91 and 7.98 L/hr for groups 5, 20 and 100 mg/m^3, respectively. Supply air was delivered to the chamber at 8000 L/hr for all groups and exhausted at 8300, 8300 and 8110 L/hr for groups 5, 20 and 100 mg/m^3, respectively. Exhaust flow was higher than entry flow for the treated animals to assure that no MITC-contaminated air escaped the chamber. The exhaust flow was 7800 L/hr for the 0 mg/m ^{3} group to assure that no laboratory air entered the chamber; that is, the chamber was under slight relative positive pressure.

The temperature of the chamber air was measured with a mercury bulb thermometer and recorded at 30 minute intervals during each exposure. The humidity was measured twice during each exposure by means of humidity measuring probe.

Mean in-chamber temperature and relative humidity measurements are reported in **Table 1**.

Table 1. Temperature and Relative Humidity of Chamber Air

Group No.	MITC (mg/m³)	Temperature (ºC)	Relative Humidity (%)
0	0	21.7 ± 0.23	51 ± 1.64
1	5	22.0 ± 0.16	50 ± 1.42
2	20	22.2 ± 0.25	49 ± 1.09
3	100	29.9 ± 0.26	49 ± 1.20

Six air samples per concentration group were taken from the breathing zone daily and analyzed by gas chromatography. The daily mean concentration and the overall mean concentration and SD of MITC are shown in **Table 2**.

Based upon the conversion factor of 1 mg/m³ MITC = 0.33 ppm MITC, the MITC concentrations in the Klimisch Study were 0, 1.6, 6.6 and 33 ppm.

Table 2. Chamber concentration of MITC (mg/m^3)

	Group		
Date	1	2	3
11/21/1985	4.7	18.2	93.5
11/22/1985	5.3	19.2	94.8
11/23/1985	4.8	21.2	111.8
11/25/1985	4.6	16.7	98.2
11/26/1985	5.4	19.0	99.5
11/27/1985	4.9	21.0	104.3
11/28/1985	5.0	20.1	98.8
11/29/1985	5.8	20.1	112.5
12/02/1985	6.0	21.6	103.3
12/03/1985	5.4	20.0	105.3
12/04/1985	6.2	21.2	102.8
12/05/1985	5.7	21.5	97.2
12/06/1985	5.4	19.8	95.5
12/09/1985	4.6	18.1	96.6
12/10/1985	4.4	19.6	99.1
12/11/1985	5.0	21.1	97.7
12/12/1985	4.5	21.0	94.2
12/13/1985	5.0	20.0	95.7
12/16/1985	4.6	19.5	97.8
12/17/1985	4.7	19.9	101.3
Mean	5.1	19.9	100.0
SD	0.53	1.27	5.33

C. Clinical Observations

1. Summary Statements from Klimisch Report

The report contains no detailed accounting of clinical signs. Therefore; no animal-by-animal, dose versus dose or male versus female evaluation of the effect of MITC on the eye and respiratory tract during the exposure period is possible.

The report offers the following information on pp 37-38.

"*The animals in tests groups 0 and 1 were free of substance-related signs during exposures and in the intervals between exposures.*

During exposure, the animals of test group 2 showed eyelid closure, somnolence, and ruffled fur from the third day of exposure onwards. On the next morning before exposure nothing abnormal was found in the animals.

The animals in test group 3 showed these signs to a greater extent during exposure.
As the duration of the study increased, there was also reddish nasal discharge, in some animals salivation and discharge from the eyes, intensified cleaning (region of head), and difficulty in breathing or whooping respiration, and stretched posture. From time to time, the male animals were seen breathing in an upright position in the inhalation cages.

Initially, the animals recovered until the next exposure. As the duration of the study increased, the signs in test group 3 (ruffled fur and, in some animals, respiratory sounds towards the end of the study) were no longer reversible.

Assessment

Wistar rats tolerate repeated 6-hour inhalation of 5 mg/m^3 without any substance-related signs. At 20 mg/m^3, the animals showed first indications of an irritating effect of the test substance and a slightly deteriorated general state of health. At the end of exposure the animals began to recover. At 100 mg/m^3 signs of an irritating effect on the mucous membranes and respiratory tract were clearly pronounced, and thus the animals' breathing pattern was changed. These signs were, as the duration of the study increased, no longer reversible during the non-exposure periods.

There were no lethalities."

2. Signs and Definitions

Signs and observations contained in the quotation above that describe apparent treatment-related effects on the eye and respiratory tract are listed below. The definitions and interpretations are those of the reviewer.

a. Eyelid closure: interpreted as blepharospasm or involuntary spasmodic contraction of the orbicularis oculi muscle in response to an irritant effect on sensory nerve receptors of the cornea.

b. Reddish nasal discharge: interpreted as **c**hromorhinorrhea. In common with a number of rodent species, the rat normally produces porphyrin-pigmented tears from the Harderian lacrimal gland. Increased secretion of porphyrin may result in red-stained tears, a

condition known as chromodacryorrhea. The red-stained lacrimal fluid (red tears) drains into the nasal cavity via the nasal lacrimal duct resulting in a red-colored nasal discharge, a condition known as chromorhinorrhea. While chromodacryorrhea/chromorhinorrhea may result from infection or inflammation of the Harderian gland, the condition(s) may be a manifestation of generalized stress also. Customarily, chromorhinorrhea/chromodacryorrhea is not considered a toxicological effect *per se*.

c. Discharge from eyes: this observation suggests either lacrimation (an excess of tears, tearing, watery eye) and/or chromodacryorrhea (red tears) or perhaps both.

d. Difficulty in breathing: dyspnea (breathlessness, difficult breathing, shortness of breath).

e. Whooping respiration: in man, whooping respiration is defined as loud sonorous inspiration due to spasm of the larynx. In context of this study, whooping respiration may be the result of the irritating effect of the test substance on sensory nerve receptors in the mucosa of the larynx and/or bronchi resulting in laryngospasm and/or bronchospasm and thus a 'whooping' respiration.

Absent definitive accounting, it is impossible to assemble the clinical observations in a manner that clearly demonstrates a dose-response effect other than to know that exposure of all test animals at 5 mg/m^3 resulted in no effect whatsoever. Further, the apparent treatment-related effects seen at 20 mg/m^3 seemed to be less severe and temporary as compared to similar effects seen at 100 mg/m^3.

D. Lung Weights:

The liver, kidneys, adrenal glands, testes and lungs were weighed at necropsy. **Table 3** shows the individual and mean lung weights by sex, animal number and group.

Table 3. Lung Weights

	Male		Female	
Dose (mg/m^3)	Rat No.	Lung weight (g)	Rat No.	Lung weight (g)
0	1	0.89	21	0.67
2	0.90	22	0.64	
	3	0.99	23	0.63
	4	1.09	24	0.63
	5	0.94	25	0.55
	Total	4.81		3.12
	Mean	0.96		0.62
	SD	0.0817		0.0445
5	6	1.10	26	0.69
	7	1.09	27	0.85
	8	1.11	28	0.74
	9	0.94	29	0.69
	10	0.90	30	0.56
	Total	5.14		3.53

		Mean	1.03				0.71
		SD	0.0998				0.1045
20		11	1.05		31		0.67
	12		0.88		32		0.78
		13	0.83		33		0.69
		14	1.00		34		0.70
		15	0.89		35		0.59
		Total	4.65				3.43
	Mean		0.93				0.69
		SD	0.0914				0.0680
100		16	2.09		36		0.75
		17	1.55		37		1.44
	18		1.55		38		0.74
		19	1.13		39		0.69
		20	1.93		40		1.69
		Total	8.25				5.31
		Mean	1.65				1.06
		SD	0.3750				0.4682

E. Macroscopic Findings

1. Terms and Definitions

Gross or macroscopic observations that relate to the lung are listed below. The definitions and interpretations are those of the reviewer. There was no gross observation for the nasal cavity, trachea or eye.

a. Bright: interpreted as indicating a reddened appearance to the pleural surface(s) of the lung, perhaps indicating congestion and/or hyperemia.

b. Stiff consistency: this suggests emphysema (enlargement of air spaces distal to the terminal bronchioles). In rats one would expect the emphysema to be simply distention of alveoli, perhaps associated with strenuous (whooping) respiration, but not due to injury to intra-alveolar septa.

c. Red/dark area/focus with firm consistency: this observation is compatible with red hepatization or a liver-like state of the lung. Red hepatization suggests an early stage of pneumonia.

d. White area with firm consistency: this observation suggests grey hepatization or a later somewhat organized or fibrotic stage of pneumonia.

e. Glassy transparent area: this suggests a grossly visible granulomatous type lesion perhaps a foam cell granuloma; that is, a circumscribed collection of lipid laden foam cells.

f. Sunken areas: suggests areas of scarring or hepatization.

2.Tables

Table 4 shows gross or macroscopic findings for the lungs.

Table 4. Macroscopic Findings - Lungs

Dose		Sex	
(mg/m^3)	Finding	Male	Female
0	Number of rats examined	5	5
	No treatment related finding	+++++	+++++
5	Number of rats examined	5	5
	No treatment-related finding	+++++	+++++
20	Number of rats examined	5	5
	No treatment-related finding	+++++	+++++
100	Number of rats examined	5	5
	No treatment-related finding	0	++
	Bright	+++++	+++
	Stiff consistency	++++	+++
	Red/dark area/focus with firm consistency	++	
	White area with firm consistency	+	
	Glassy transparent area	+	
	Sunken areas		+

F. Microscopic Findings:

1. Terms and Definitions

Histopathological findings that relate to the nasal cavity, trachea and lungs are listed below. The definitions and interpretations are those of the reviewer. Again, the eyes were not collected for microscopic examination.

A. Nasal Cavity

The need for careful and consistent tissue trimming and embedding procedures in the examination of the nasal cavity of rodents cannot be overemphasized nor can the need for an extensive knowledge of the histological differences from region to region in the nasal cavity. There are also substantial differences in histological features of the nasal mucosa between the

commonly used strains of the laboratory rat. Also, histological features of the major regions of the nasal cavity change with age. Finally, histopathological changes attributed to test substances may also be due to conditions in the inhalation chamber, intercurrent disease and laboratory husbandry as well.

a. Atrophy of the olfactory epithelium: a focal or diffuse thinning of the olfactory epithelial membrane. If a true observation it would be an indication of focal or diffuse cellular injury resulting in cell loss and thinning of the membrane.

b. Catarrhal purulent rhinitis: generally characterized by an irregular layer of mucinous material containing variable numbers of neutrophils. The underlying mucosa generally exhibits hyperemia, edema and an infiltration by neutrophils. Goblet cell hyperplasia should also be a feature.

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c. Metaplasia of respiratory epithelium: most often metaplastic respiratory epithelium exhibits the characteristics of transitional or more commonly squamous epithelium. If a true observation it would reflect a compensatory (protective) change on the part of respiratory epithelium to an irritant.

B. Trachea

a. Accumulation of lymphocytes: a common and generally non-significant finding in the tracheal mucosa of the rat.

b. Epithelial proliferation: the trachea and bronchi are lined by pseudostratified ciliated epithelium. Proliferation would indicate a focal or diffuse proliferation of one or more of the cell types that make up the membrane.

d. Mucopurulent inflammation: see above. Mucopurulent inflammation is a common form of inflammatory response on the part of the respiratory tract because of the makeup of the lining membrane.

e. Single cell necrosis: death of single or individual cells within the mucosal membrane.

C. Lung

a. Atelectasis: is loss of lung volume due to inadequate expansion of airspaces (alveoli). There may be several causes.

b. Bone metaplasia: a few, small foci of calcification and/or osseous metaplasia (bone metaplasia) of unknown histogenesis can nearly always be found somewhere within intrapulmonary arteries of adult rats if one looks closely enough. Also mineral deposits may be observed within septa (alveolar septal calcification). Whatever the terminology, the bone or mineral deposits have no pathological significance.

c. Bronchopneumonia: bronchopneumonia implies a patchy distribution of pulmonary inflammation. The pattern results from the initial infection (injury) of the bronchi and bronchioles with extension into adjacent alveoli. In rats, bronchopneumonia (bronchointerstitial pneumonia) may be a manifestation of infection with a respiratory pathogen. Inhalation of a toxicant may result in cellular injury or death and resultant inflammation of the bronchial tree.

d. Emphysema: in the rat emphysema is usually seen as abnormal enlargement of the distal air spaces without associated evidence of alveolar wall destruction.

e. Epithelial proliferation, bronchi and bronchioles: also known as bronchiolo-alveolar hyperplasia. Bronchiolo-alveolar hyperplasia is a very common response in the rat to a wide range of pulmonary irritants. The hyperplastic cells originate from secretory bronchiolar (Clara) cells, alveolar type II cells or a combination of the two cell types.

f. Foam cell/foam cell granuloma: also known as alveolar histiocytosis. Refers to the presence of varying numbers of alveolar macrophages whose cytoplasm is swollen and foamy due to the accumulation of lipids. May be associated with varying degrees and stages of inflammation resulting in the formation of granulomatous like lesions (foam cell granuloma).

g. Inflammatory infiltrate, perivascular/peribronchial: also known as interstitial lymphoid accumulation. Interstial lymphoid accumulation is fundamentally a hyperplastic or increased presence of bronchus-associated lymphoid tissue or BALT. Its presence is associated with a high probability of past infection with murine respiratory viruses.

2. Tables

Table 5 shows the histopathological findings for the nasal cavity. Nasal cavity levels 1 through 4 were not defined in the text but may be assumed to represent vertical sections of the maxilloturbinates, nasoturbinates and septum lined by respiratory and olfactory epithelium. Due to preparation difficulties the vestibule or the most anterior aspect of the nasal cavity lined by stratified squamous epithelium is usually not sectioned.

The reader should note the diagnoses of *catarrhal purulent rhinitis* and *atrophy of the olfactory epithelium* in the non-exposed group of rats. The diagnoses indicate either a concurrent infection or an adverse effect of the chamber air environment or both. Whatever the cause, the incidence of the lesions in the control animals should be 'subtracted' from the incidence of similar lesions in the treated animals. When this is done, a clear toxicological effect is recognizable only at the 100mg/m^3 dose level.

The grading system progresses from 1 (minimal) to 5 (severe) in degree of injury or response.

Table 5. Microscopic Findings – Nasal Cavity

Dose	(mg/m^3)	Finding	Sex: Male (grade)	Sex: Female (grade)
0		Number of rats examined	5	5
		No treatment-related finding	3	4
		Rhinitis, catarrhal purulent Level 1	+ (2)	

	Level 2	+ (2)	
	Level 3	++ (3,2)	
	Level 4	+ (1)	
	Atrophy, olfactory epithelium		
	Level 2	++	+
	Level 3	++	
	Level 4	+	
5	Number of rats examined	5	5
	No treatment-related finding	2	1
	Rhinitis, catarrhal purulent		
	Level 1	+ (1)	++ (1,1)
	Level 2		+ (2)
	Level 3	+ (3)	++ (1,1)
	Level 4		+ (3)
	Atrophy, olfactory epithelium		
	Level 2	+++	+++
	Level 3	++	++
	Level 4		+
20	Number of rats	5	5
	No treatment-related finding	1	1
	Rhinitis, catarrhal purulent		
	Level 1	+ (1)	+ (1)
	Level 2		
	Level 3	+ (2)	
	Level 4	+ (2)	
	Atrophy, olfactory epithelium		
	Level 2	+++	+++
	Level 3	+++	+
	Level 4	+	
100	Number of rats	5	5
	No treatment-related finding	0	0
	Rhinitis, catarrhal purulent		
	Level 1	+++++ (4,4,4,4,4)	+++++(3,4,3,3,4)
	Level 2	+++++ (2,4,4,4,5)	+++++(3,4,2,1,4)
	Level 3	+++++ (2,3,3,3,2)	+++++(3,3,3,2,2)
	Level 4	+++++ (2,3,4,3,2)	++++ (1,3,2,2)
	Atrophy, olfactory epithelium		
	Level 2	+++++	+++++
	Level 3	+++++	+++++
	Level 4	+++++	+++++
	Metaplasia, respiratory epithelium		
	Level 1	+++	+++++
	Level 2		++

Table 6 shows the histopathological findings for the trachea. *Accumulation of lymphocytes* is not a significant finding.

Table 6. Microscopic Findings – Trachea

Dose (mg/m^3)	Finding	Sex Male	Female
0	Number of rats examined	5	5
	No treatment-related finding	5	4
	Accumulation of lymphocytes		+
5	Number of rats examined	5	5
	No treatment-related finding	4	4
	Accumulation of lymphocytes	+	+
20	Number of rats examined	5	5
	No treatment-related finding	5	5
100	Number of rats examined	5	5
	No treatment-related finding	0	0
	Epithelial proliferation	+++++	+++++
	Single cell necrosis	+++++	+++++
	Inflammation, mucopurulent	+	+

Table 7 shows the histopathological findings for the lung. The diagnoses of *inflammatory infiltrate perivascular/peribronchial*; *foam cell/foam cell granuloma* and *bone metaplasia* are not significant histopathological findings.

Table 7. Microscopic Findings – Lung

Dose (mg/m^3)	Finding	Sex Male	Female
0	Number of rats examined	5	5
	No treatment-related finding	4	3
	Inflammatory infiltrate, perivascular/peribronchial	+	+
	Foam cell/foam cell granuloma		++
5	Number of rats examined	5	5
	No treatment-related finding	3	3
	Foam cell/foam cell granuloma	+	+
	Inflammatory infiltrate, perivascular/peribronchial	+	++
20	Number of rats	5	5
	No treatment-related finding	3	5
	Inflammatory infiltrate, perivascular/peribronchial	++	

100	Number of rats		5		5
	No treatment-related finding	0		0	
	Emphysema		+++		++
	Atelectasis		+		
	Bronchopneumonia	+++++		++	
	Epithelial proliferation, bronchi and bronchioles		+++++		+++
	Foam cell/foam cell granuloma				+
	Bone metaplasia		+++		

G. Discussion

1. Clinical effects

The summary presented on pp 37-38 of the Klimisch Report is the sole source of information as to nature of clinical signs that may be attributed to whole-body exposure of young adult male and female Wistar rats to one of four concentrations of MITC for 6 hours a day for 20 days or a total of 120 hours since clinical signs were not reported on an individual animal-by-animal, sex-by-sex or dose-by-dose level basis.

No clinical signs (behavioral or physical) were seen in any rat exposed at the 0 or 5 mg/m^3 dose level of MITC. Absence of clinical signs such as tearing for the ocular system or sneezing for the respiratory system is of particular importance since one or the other of these signs would be the first signalment a discomforting environment.

Clinical signs at the 20 mg/m^3 dose level included eyelid closure (blephoraspasm), somnolence and ruffled fur. The report indicated that these signs largely disappeared during the between-exposure recovery periods.

Clinical signs at the100 mg/m^3 dose level included eyelid closure, somnolence, reddish nasal discharge (chromorhinorrhea), salivation, ocular discharge (lacrimation and/or chromodacryorrhea), cleaning of the head and face, dyspnea, whooping respiration and stretched posture. The report indicated that with continued exposure these signs did not disappear during the between-exposure recovery periods.

Blephoraspasm and ocular discharge indicate that MITC affected the ocular system at the 20 and 100 mg/m^3 dose levels. Two other signs, dyspnea and whooping respiration, indicate that MITC affected the respiratory system at the 20 and 100 mg/m^3 dose levels also; however, the effects were less severe and short-lived at the 20 mg/m^3 dose level than at the 100 mg/m^3 level.

2. Organ weights

Table 3 shows the absolute lung weights.

The mean absolute lung weight for males at the 100 mg/m^3 dose level of 1.65 g; as compared to 0.96, 1.03 and 0.93 g for dose levels 0, 5 and 20 mg/m^3, respectively; clearly

shows an exposure effect at the high dose level with no suggestion of a dose-related trend at the lower dose levels.

Similarly, the mean absolute lung weight for females at the 100 mg/m^3 dose level of 1.06 g; as compared to 0.62, 0.71 and 0.69 g for dose levels 0, 5 and 20 mg/m^3, respectively; clearly shows an exposure effect at the high dose level with no suggestion of a dose-related trend at the lower dose levels.

The lung weight data indicate that gross and/or microscopic pathological findings should be present in most if not all rats exposed to MITC at the 100 mg/m^3 level.

2. Necropsy findings

a. Eye

No gross (macroscopic) change was reported for the eye at any dose level.

b. Lung

Table 4 shows the gross observations for the lungs.

There were no apparent treatment- or chamber atmosphere-related effects at the 0, 5 or 20 mg/m^3 dose levels. Five of 5 males and 3 of 5 females showed effects at the 100 mg/m^3 dose level. Observations such as *bright (congestion and/or hyperemia), red/dark area/focus with firm consistency (red hepatization) and white area with firm consistency (grey hepatization)* would largely account for increased absolute lung weight seen in both sexes at the high dose level.

3. Microscopic findings

a. Eye

Since no gross changes were seen in the eyes at necropsy, eyes were not collected for microscopic examination.

b. Nasal cavity

Table 5 shows the microscopic findings for the nasal cavity.

A low incidence of *catarrhal purulent rhinitis* was seen at all dose levels below 100 mg/m^3 including 0 mg/m^3. The presence of acute inflammation in control animals suggests three possibilities: 1) the presence of an infectious agent, 2) conditions within the inhalation chamber sufficiently different from animal room conditions so as to injure the nasal mucous membrane even in the absence of any concentration of MITC, and 3) poor animal room husbandry such as the infrequent bedding changes that would allow the build up of ammonia in cages or the animal room as a whole resulting in a rhinitis in any animal within the room including those used in the inhalation study.

Atrophy of the olfactory epithelium was also seen at all dose levels including 0 mg/m^3. Focal or diffuse atrophy of any region of the nasal mucosa means loss or reduction in size of lining cells. The atrophy could be a sequel to infection, living in an inhospitable

environment, an introduced toxicant or aging. Since age is not a factor, any or all of the other etiologies singly or in combination should be considered.

Although the data show increased incidence but not increased severity for both rhinitis and atrophy at the 5 and 20 mg/m^3 dose levels (as compared to control), the absent of any evidence of a dose-related trend for either incidence or severity argues against either effect being due to exposure to MITC.

On the other hand, the effect of MITC at the 100 mg/m^3 level is clear even when the incidence and severity data at the lower dose levels are taken into account. Further, metaplasia of the respiratory epithelium, seen only at the 100 mg/m^3 dose level, serves to certify the toxicological effects of MITC at the 100 mg/m^3 dose level.

c. Trachea

Table 6 shows the microscopic findings for the trachea.

The data show a treatment-related effect at the 100 mg/m^3 dose level only. This is supports the conclusion that microscopic changes seen in the nasal cavity are significant only at the 100mg/m^3 level. Further, the character of the tracheal histopathology is compatible with nasal histopathology.

d. Lung

Table 7 shows the microscopic findings for the lung.

The data show a treatment effect at the100 mg/m^3 dose level only.

The diagnoses of *inflammatory infiltrate, perivascular/peribronchial* and *foam cell/foam cell granuloma* are not only of no toxicological significance but further evidence of infection with a respiratory pathogen and/or the effect of an adverse animal room environment upon the lung. *Bone metaplasia* is an incidental finding. And, finally, the nature of the histopathology recorded for the lung at the 100 mg/m^3 dose level is compatible with the gross observations and the increased lung weigh seen at that that dose level.

H. Conclusion

1. Definitions

Traditionally, differentiation between adverse and non-adverse effects in toxicology studies is based upon definitions such as found in the *European Centre for Ecotoxicology and Toxicology of Chemicals Technical Report No 85* (Brussels, December 2002) cited below.

a. Non-adverse effect: *those biological effects that do not cause biochemical, behavioural, morphological or physiological changes that affect the general well-being, growth, development or life span of an animal.*

b. Adverse effect: *a biochemical, behavioural, morphological or physiological change (in response to a stimulus) that either singly or in combination adversely affects the performance of the whole organism or reduces the organism's ability to respond to an additional environmental challenge.*

c. NOEL: *the highest exposure level at which there are no effects (adverse or non-adverse) observed in the exposed population, when compared with its appropriate control.*

d. NOAEL: *the highest exposure level at which there are no statistically or biologically significant increases in the frequency or severity of adverse effects between the exposure population and its appropriate control. Some effects may be produced at this level, but they are not considered to be adverse or precursors to adverse effects.*

e. LOAEL: *the lowest exposure level at which there are statistically or biologically significant increase in the frequency or severity of adverse effects between the exposed population and its appropriate control group.*

However, traditional definitions fail to account for responses that are not only biologically non-adverse but are in fact positive, healthy beneficial reflexes on the part of an organ to protect the entire organism.

B Ballantyne discusses this type of response at length (*Inhalation Toxicology, edited by H Salem and S Katz, 2006, CRC Press, Chapter 13: Peripheral Chemosensory Irritation with Particular Reference* to *Respiratory Tract Exposure, pp 269-306*).

The following is extracted from paragraph **13.1 Nature of the Peripheral Sensory Irritant Effect** (p 270).

"Peripheral sensory irritation (PSI) is a pharmacological effect in which xenobiotics interact with sensory nerve receptors in the skin or mucosae to produce a local sensation (discomfort, itching, burning sensation, or pain) together with related local and some systemic (autonomic) reflexes. The effects subside after removal of the stimulus and do not result in long-term adverse sequelae. Hence, the major characteristics of a PSI event are that the materials act locally (in skin or mucosae) by stimulating sensory nerve receptors and producing local sensations with locally mediated and some systemic reflexes (Ballantyne, 1999). Many substances causing a pharmacological PSI effect will also produce, usually at a higher applied concentration, an inflammatory response. Thus, a PSI effect may result in a protective biological warning of exposure to potentially harmful materials. Originally, PSI effects were attributed to a common chemical sense independent of touch, temperature, and pain (Parker, 1912). However, it was subsequently demonstrated that PSI effects are mediated by several types of receptors, most of which also respond to noxious, thermal, and/or mechanical stimuli (Green, 2000). Thus the idea of common chemical sense was replaced by the concept of that PSI effects are mediated principally by chemically sensitive neural elements of pain and temperature; i.e., a process of chemosensory irritation (PCI). The word 'chemestheses' was introduced to stress that chemosensory irritation is a multimodal sense (Green et al., 1990)"

Based upon the above, the reviewer has coined the term **Peripheral Sensory Irritation Effect Level** or **PSIEL** to describe the level, or more realistically the range of concentrations at which a irritant, in this case MITC, causes a chemesthetic type response upon the part of an organ or organ system.

2. Pharmacological and toxicological endpoints (PSIEL, NOEL, NOAEL and LOAEL)

Application of the above definitions to data contained within the Klimisch Report results in the following pharmacological and toxicological endpoints or effect levels in young male and female Wistar rats exposed whole body for 6 hours a day for 20 days (120 hours) to one of 4 concentrations of vaporous MITC in an inhalation chamber. The endpoints are listed by a. clinical sign, b. necropsy finding, c. organ weight, and d. microscopic finding.

a. Clinical signs

Eye

NOEL: 5 mg/m^3 (1.6 ppm)
PSIEL for blephoraspasm - 20 and 100 mg/m^3 (6.6 and 33 ppm)
PSIEL for lacrimation – 100 mg/m (33 ppm)
LOAEL: none

Respiratory tract

NOEL: 5 mg/m^3 (1.6 ppm)
NOAEL: 20 mg/m^3 (6.6 ppm)
LOAEL for dyspnea and whooping respiration - 100 mg/m^3 (33 ppm)

b. Necropsy findings

Eye

There was no gross pathologic finding.

Nasal cavity

There was no gross pathological finding.

Trachea

There was no gross pathological finding.

Lungs

NOEL: 5 mg/m^3 (1.6 ppm)
NOAEL: 20 mg/m^3 (6.6 ppm)
LOAEL for treatment-related macroscopic change - 100 mg/m^3 (33 ppm)

c. Organ weight

Lungs

NOEL: 5 mg/m^3 (1.6 ppm)
NOAEL: 20 mg/m^3 (6.6 ppm)
LOAEL for increased lung weight - 100 mg/m^3 (33 ppm)

d. Microscopic findings

Eye

The eyes were not collected at necropsy and there was no microscopic examination.

Nasal cavity

NOEL: 5 mg/m^3 (1.6 ppm)
NOAEL: 20 mg/m^3 (6.6 ppm)
LOAEL for treatment related microscopic change - 100 mg/m^3 (33 ppm)

Trachea

NOEL: 5 mg/m^3 (1.6 ppm)
NOAEL: 20 mg/m^3 (6.6 ppm)
LOAEL for treatment-related microscopic change - 100 mg/m^3 (33 ppm)

Lungs

NOEL: 5 mg/m^3 (1.6 ppm)
NOAEL: 20 mg/m^3 (6.6 ppm)
LOAEL for treatment-related microscopic change - 100 mg/m^3 (33 ppm)

-End-

Written by:
Robert W Thomassen, DVM
Diplomate, The American College of Veterinary Pathologists (Emeritus)
09/14/2008

Appendix C: Methods for the development of Figures 5, 6, and 7

In order to properly combine the individual data sets for lacrimation and eye closure, as well as dyspnea and gasping, we used the equation

1-(PxQ) = Y

where P represents the probability that effect A did not occur, Q represents the probability that effect B did not occur, and Y represents the probability that A and/or B did occur. Y is rounded to the nearest whole number. In two instances, Y equaled 6.5 and 5.5. Because consistently rounding up or down would create bias when translating these probabilities to the estimated number of affected animals, *TERA* instead randomly determined, through a coin toss, whether the number should be rounded to the higher or lower integer. The resulting combined data is shown in Tables C1 and C2.

Another complication with the raw data from this study is the prevalence of dead animals at the highest exposure concentration (1640 mg/m^3). We determined that including these data points as 100% or 0% response would be misleading, since we cannot determine whether these animals would have continued or stopped responding. Therefore, we decided to exclude these data points.

Table C1. The representation of total eye effects (based on the combination of lacrimation and eye closing data), observed in the Jackson et al. (1981) study. [14]

	Concentration(mg/m3)						
Exposure Time (hrs)	**0**	**282**	**496**	**570**	**628**	**786**	**1640**
0.25	0	10	10	10	10	10	10
0.5	0	10	10	10	10	10	10
1.0	0	10	10	10	10	10	10
1.5	0	10	10	10	10	10	10
2.0	0	10	10	10	10	10	9*
2.5	0	10	10	10	10	10	3**
3.0	0	10	10	10	10	0	***
3.5	0	10	9	10	10	0	***
4.0	0	10	9	10	10	0	***

[14] The number of dead animals in this study is represented by the star symbol (*). One star represents one dead animal at that time and concentration. Two stars represent 7 dead animals, and 3 starts represent 10 dead animals. The same holds true for table 7.

Table C2. The representation of total lung effects (based on the combination of dyspnea and gasping), observed in the Jackson et al. (1981) study.

	Dose (mg/m3)						
Exposure Time (hrs)	**0**	**282**	**496**	**570**	**628**	**786**	**1640**
0.25	0	1	0	0	0	0	0
0.5	0	2	0	0	0	5	3
1.0	0	2	0	0	0	0	4
1.5	0	0	0	2	0	2	10
2.0	0	0	2	5	0	3	9*
2.5	0	2	4	4	3	4	3**
3.0	0	4	5	3	5	4	***
3.5	0	3	7	4	7	7	***
4.0	0	4	7	4	9	9	***

Appendix D: The California Department of Pesticide Regulation Pesticide Illness Surveillance Program (PISP) database for MITC

Table D1. Case Reports Received by the California Pesticide Illness Surveillance Program, 1992-2006 In Which Health Effects Were Evaluated as Definitely, Probably, or Possibly Related to Exposure to Metam-Sodium, Metam-Potassium, Dazomet, or Methyl Isothiocyanate.

Year	Case	Relationship[15]	Type of Illness	Medical Description	Narrative Description
1992	165	Probable	Eye, Systemic	IRRITATED EYES, RAPID HEART BEAT, DIZZINESS.	5-SB-92. METAM-SODIUM WAS SHANK-INJECTED INTO A FIELD AND SEALED IN WITH A ROLLER. NO ODOR WAS NOTED AFTERWARDS. THE AIR MOVEMENT WAS STAGNANT LATER THAT EVENING. NORTHWEST OF THE FIELD, A FAMILY OF 6 DEVELOPED SYMPTOMS. SEE 92-166 TO 170.
1992	166	Probable	Eye	WATERY EYES.	5-SB-92. SEE 92-165.
1992	167	Probable	Eye, Respiratory, Systemic	NAUSEA, THROAT IRRITATION, EYE IRRITATION, INCREASED HEART RATE.	5-SB-92. SEE 92-165.
1992	168	Probable	Eye	TEARING OF EYES, INJECTED CONJUNCTIVA.	5-SB-92. SEE 92-165.
1992	169	Probable	Eye, Respiratory	BURNING EYES, TIGHTNESS IN THE CHEST.	5-SB-92. SEE 92-165.
1992	170	Probable	Eye	WATERY EYES, SLIGHT CONJUNCTIVAL INJECTION.	5-SB-92. SEE 92-165.
1992	266	Possible	Systemic	HEADACHES.	EMPLOYEE HANDLING VAPAM TRANSFER FROM TRUCK TO BULK TANKS. NO KNOWN EXPOSURE INCIDENT. EMPLOYER STATED THIS IS THIS WORKERS' THIRD ILLNESS IN 2 YRS. AND IS NOW REQUIRED TO WEAR RESPIRATOR WHEN ENTERING WAREHOUSE AND WHEN WORKING W/ANY PESTICIDE.
1992	610	Probable	Eye	MILD TO MODERATE CONJUNCTIVITIS, BOTH EYES.	EMPLOYEE TRANSFERRING VAPAM FROM NURSE RIG TO TOW RIG AND VAPORS GOT IN HIS EYES IRRITATING THEM. HE SOUGHT MEDICAL ATTENTION THE NEXT DAY.
1992	1110	Definite	Skin	FEET BEGAN TO STING AND	EMPLOYEE HAD GONE OVER TO ASSIST ANOTHER EMPL IN

[15] Definite relationship indicates that both physical and medical evidence document exposure and consequent health effects. Probable relationship indicates that limited or circumstantial evidence supports a relationship to pesticide exposure. Possible relationship indicates that evidence neither supports nor contradicts a relationship.

				BURN, SKIN OF FOOT IS RED AND TENDER.	PHYSICALLY REMOVING TANK FROM APPLICATION PORTION OF TRACTOR.HOSE FM TANK WAS STILL CONNECTED.LIQUID HAD ACCUMULATED ON IT. WHEN DISCONNECTING, MATERIAL SPILLED INTO HIS BOOTS.NOTICED BURNING SENSATION.
1992	1201	Probable	Skin	MILD ERYTHEMA OF MEDICAL ASPECT OF FEET; BURNING AND STINGING SENSATION.	WHILE UNLOADING METAM-SODIUM INTO A FIELD TANK FOR USE BY OTHERS, SOME OF THE PESTICIDE LEAKED ONTO THE EMPLOYEE'S ANKLE AND FEET.
1992	1788	Possible	Skin	DIFFUSE MACULO PAPULAR RASH WITH PRURITIS ON THE ARMS, LEGS AND TRUNK. MODERATE EDEMA OF FOREARMS.	AFTER APPL, HE REMOVED HIS PROTECTIVE GEAR- WAS TOLD TO DISCONNECT A HOSE. HE FAILED TO CLOSE A VALVE BEFORE DOING SO & MATERIAL SPILLED ON HIS ARM & SHOES. HE SAID HE IS ALLERGIC TO TYVEK (MAKES HIM ITCH) FEELS IT CAUSED MOST OF RASH-BURN ON HIS ARM WAS
1992	1874	Possible	Skin, Eye, Respiratory, Systemic	BURNING EYES, SORE THROAT, RASH, HEADACHE, NAUSEA, DIARRHEA.	59-KER-92. A FAMILY OF FIVE BECAME ILL, REPORTEDLY FROM A METAM-SODIUM SPRINKLER CHEMIGATION IN THE FIELD ACROSS FROM THEIR HOUSE. THEY SOUGHT MEDICAL ATTENTION 42 DAYS LATER. DISCREPANCY IN THE INCIDENT DATE (8/10 VS. 8/12) COULD NOT BE RESOLVED.
1992	1875	Possible	Skin, Eye, Respiratory, Systemic	BURNING EYES, SORE THROAT, RASH, HEADACHE, NAUSEA, DIARRHEA.	59-KER-92. SEE 92-1874. SHE SAW A DOCTOR 42 DAYS AFTER EXPOSURE.
1992	1876	Possible	Skin, Eye, Respiratory, Systemic	BURNING EYES, RASH, SORE THROAT, HEADACHE, NAUSEA, DIARRHEA.	59-KER-92. SEE 92-1874. HE SAW A DOCTOR 42 DAYS AFTER EXPOSURE.
1992	1877	Possible	Skin, Eye, Respiratory, Systemic	BURNING EYES, RASH, SORE THROAT, HEADACHE, NAUSEA, DIARRHEA.	59-KER-92. SEE 92-1874. SHE SAW A DOCTOR 42 DAYS AFTER EXPOSURE.
1992	1878	Possible	Skin, Eye, Respiratory, Systemic	BURNING EYES, RASH, SORE THROAT, HEADACHE, NAUSEA, DIARRHEA.	59-KER-92. SEE 92-1874.
1992	2269	Possible	Skin	RASH ALL OVER BODY.	WORKER DEVELOPED RASH AFTER CHANGING DISKING EQUIPMENT IN A FIELD FUMIGATED FIVE DAYS EARLIER. HE WAS DISKING AND BEDDING UP THE FIELD.
1992	2367	Probable	Skin, Eye	MODERATELY INJECTED LEFT EYE WITH A SMALL AMOUNT OF DISCHARGE.ERYTHEMATOUS SKIN AT LATERAL CORNER.	A FIREFIGHTER WAS EXPOSED TO METAM-SODIUM VAPORS WHILE RESPONDING TO ODOR/EYE IRRITATION COMPLAINTS.SOURCE WAS 2.5 GAL METAM-SODIUM/WATER MIXTURE W/C LEAKED FM AN IRRIGATION PIPE AND WAS NOT WATERED IN.ODOR CEASED WHEN FIRE DEPT HOSED 700 GALS OF WATER.
1993	123	Definite	Skin	BURNING PAIN ON LEG AND FOOT.	AN APPLICATOR WAS TRANSFERING METAM-SODIUM FROM THE NURSE TANK TO THE SPRAY RIG TANK WHEN A HOSE CLAMP CAME OFF. THE MATERIAL SPILLED OUT ONTO HIS LEFT LOWER LEG AND FOOT. HE WASHED OFF THE AFFECTED AREA, BUT STILL

					RESULTED IN A BURN.
1993	126	Definite	Skin	BURNING AND REDNESS ON TOP OF FOOT.	MECHANIC WAS REMOVING A P.T.U. PUMP AND HOSE FROM A TRACTOR/GROUND RIG SPRAYER. WHILE DISCONNECTING THE HOSES SOME OF THE VAPAM IN THE HOSES SPILLED ONTO HIS SHOE. HE WASHED HIS FOOT, BUT PUT THE CONTAMINATED FOOTWEAR BACK ON.
1993	329	Definite	Skin	BURNING AND REDNESS OF RIGHT FOOT.	WORKER SPILLED METAM-SODIUM ONTO HIS WORK BOOTS WHILE CALIBRATING A FLO-METER ON A 1,000-GALLON TANK. HE NOTICED SYMPTOMS AFTER DELIVERING THE TANK TO A CUSTOMER. A NOTICE OF VIOLATION WAS ISSUED FOR THE WORKER NOT WEARING LABEL-REQUIRED RUBBER BOOTS.
1993	415	Probable	Skin	PRURITIC SCALY RASH ON CHEST.	WORKER MIXED, LOADED AND APPLIED METAM-SODIUM TO FALLOW FIELDS OVER A FOUR WEEK PERIOD. HE DEVELOPED A RASH AFTER ONE PARTICULAR DAY'S APPLICATION. HE COULD SMELL AN ODOR OF THE PESTICIDE ON HIS COVERALLS. HE KNEW OF NO PARTICULAR EXPOSURE INCIDENT.
1993	638	Definite	Eye	BURNING SENSATION TO RIGHT EYE. CONJUNCTIVAL INJECTION.	AN APPLICATOR DISCONNECTED A DELIVERY HOSE BETWEEN THE SERVICE TANK AND THE TRACTOR TANK. THE MATERIAL THAT REMAINED IN THE HOSE SPLASHED OUT AND ONTO THE RIGHT SIDE OF HIS FACE. HE TOOK OFF HIS SAFETY GLASSES, WIPED HIS FACE AND GOT SOME INTO HIS EYE.
1993	818	Definite	Respiratory, Systemic	HEADACHE, NOSE AND THROAT IRRITATION, CONGESTION.	28-SF-93. A CREW OF GARDENERS PLANTING ANNUALS IN FLOWER BEDS DETECTED A STRONG ODOR FROM THE SOIL, WHICH HAD BEEN OVER-TREATED WITH DAZOMET 13 DAYS EARLIER. ONE SOIL SAMPLE TAKEN 73 DAYS POST-APPLICATION HAD HIGH RESIDUES. SEE 93-819 TO 830 & 2113.
1993	820	Definite	Skin, Eye, Respiratory, Systemic	EYE, LIPS AND GUM IRRITATION, HEADACHE, FATIGUE, METALLIC TASTE, SHALLOW BREATHING, LIGHTHEADEDNESS.	28-SF-93. SEE 93-818. WORKER WAS SUFFERING FROM HAY FEVER DURING TIME OF INCIDENT.
1993	821	Definite	Eye, Respiratory, Systemic	BURNING EYES, THROAT IRRITATION, TIGHTNESS IN CHEST, FATIGUE, METALLIC TASTE, HEADACHE.	28-SF-93. SEE 93-818.
1993	822	Definite	Eye, Systemic	EYE IRRITATION, LIGHTHEADEDNESS, FATIGUE, DISORIENTATION, METALLIC TASTE, SLIGHT COUGH.	28-SF-93. SEE 93-818.
1993	823	Definite	Respiratory, Systemic	NAUSEA, SINUS AND THROAT IRRITATION, METALLIC TASTE.	28-SF-93. SEE 93-818.
1993	824	Definite	Skin, Respiratory,	DIZZINESS, FATIGUE, H/A, SORE THROAT, FACE & WRIST REDNESS,	28-SF-93. SEE 93-818.

			Systemic	BURNING FEELING ON FACE, METALLIC TASTE.	
1993	826	Definite	Skin, Systemic	HEADACHE, ITCHY SKIN ON ARMS AND LEGS.	28-SF-93. SEE 93-818.
1993	828	Definite	Respiratory	BURNING OF NOSE, AND THROAT, METALLIC TASTE.	28-SF-93. SEE 93-818.
1993	829	Definite	Eye, Respiratory, Systemic	EYE AND THROAT IRRITATION, HEADACHE, FATIGUE, METALLIC TASTE.	28-SF-93. SEE 93-818.
1993	830	Definite	Respiratory	COUGHING, SCRATCHY THROAT, CHEST TIGHTNESS.	28-SF-93. SEE 93-818.
1993	860	Definite	Skin	BURNING SENSATION IN GROIN AREA.	WORKER WAS INJECTING METAM-SODIUM INTO AN IRRIGATION SYSTEM. HE COULD NOT TELL HOW MUCH MATERIAL WAS STILL TO BE INJECTED. HE TAPPED THE SIGHT GAUGE WHICH BROKE, DOUSING HIS ARM AND GROIN WITH THE MATERIAL. HE IMMEDIATELY CHANGED CLOTHES AND WASHED UP
1993	1053	Definite	Skin, Systemic	DIZZINESS, NAUSEA, BURNING, SENSATION OF RIGHT FOOT.	WHILE MOVING THE INJECTOR PUMP, SOME RESIDUAL PESTICIDE SPILLED OUT ONTO THE WORKER'S UNPROTECTED SHOE. HE HAD REMOVED HIS PROTECTIVE EQUIPMENT AFTER FINISHING A CHEMIGATION.
1993	2087	Definite	Eye, Respiratory, Systemic	ITCHY AND RED EYES, SORE THROAT, HEADACHE.	13-RIV-93. A FIELD WAS FUMIGATED WITH METAM-SODIUM. ACROSS THE ROAD, SIX RESIDENTS DEVELOPED SYMPTOMS; FIVE SAW A DOCTOR. THEY REPORTED A STRONG ODOR. SEE 93-2088 TO 2092. A RANCH EMPLOYEE (94-151) SUFFERED A CHEMICAL BURN FROM THE FUMIGATION.
1993	2088	Definite	Eye, Systemic	HEADACHE, SLIGHTLY INJECTED CONJUNCTIVA.	13-RIV-93. SEE 93-2087.
1993	2089	Probable	Systemic	VOMITING.	13-RIV-93. SEE 93-2087.
1993	2090	Probable	Respiratory, Systemic	DIZZINESS, SLIGHT SHORTNESS OF BREATH.	13-RIV-93. SEE 93-2087.
1993	2091	Definite	Eye, Respiratory, Systemic	COUGHING, EYE IRRITATION, BREATHING DIFFICULTY, LIGHTHEADEDNESS.	13-RIV-93. SEE 93-2087.
1993	2092	Definite	Skin, Systemic	NAUSEA, VOMITING, RED SKIN.	13-RIV-93. SEE 93-2087.
1993	2093	Definite	Skin, Eye, Respiratory, Systemic	NAUSEA, BURNING EYES, ITCHY SKIN, 'FROG' FEELING IN THE THROAT.	66-SJ-93. METAM-SODIUM WAS APPLIED TO A FIELD UNTIL LATE AFTERNOON. THAT EVENING, A FOG-LIKE CLOUD CAME OFF THE FIELD. AT LEAST 7 PEOPLE WERE EXPOSED; FIVE WITH RELATED SYMPTOMS. SEE 93-2094 TO 2100.
1993	2096	Definite	Skin, Eye, Respiratory, Systemic	BURNING EYES, HEADACHE, THROAT IRRITATION, ITCHY SKIN.	66-SJ-93. SEE 93-2093.
1993	2097	Probable	Skin	ITCHY SKIN.	66-SJ-93. SEE 93-2093.

1993	2099	Definite	Eye, Systemic	HEADACHE, TEARING EYES.	66-SJ-93. SEE 93-2093.
1993	2100	Definite	Eye	WATERY AND BURNING EYES.	66-SJ-93. SEE 93-2093.
1993	2113	Definite	Respiratory	CHEST PAIN, TIGHTNESS, SORE THROAT, NASAL IRRITATION, METALLIC TASTE.	28-SF-93. SEE 93-818.
1994	103	Possible	Skin, Systemic	CONVULSIONS, FATIGUE, RASH ON HANDS, VOMITING.	EMPLOYEE WAS GOING TO REMOVE A TELEPHONE POLE WHEN HE WAS EXPOSED TO MATERIAL. THE POLE WAS CUT TOO SHORT, THROUGH THE VIAL OF PESTICIDE. HE DEVELOPED SYMPTOMS SHORTLY THEREAFTER. DETAILS OF EVENT ARE NOT CLEAR.
1994	141	Probable	Eye, Systemic	HEADACHE, EYE IRRITATION.	WORKER WAS GRADING AROUND THE EDGE OF A FIELD TREATED WITH METAM-SODIUM THE DAY BEFORE. HE DETECTED AN ODOR AND SUFFERED SYMPTOMS LATER IN THE DAY.
1994	142	Probable	Eye	BURNING, RED, ITCHY AND WATERY EYES.	WORKER APPLIED METAM-SODIUM BY SOIL DRENCH TO A FIELD. HE MAY HAVE WORN CONTAMINATED BOOTS IN THE TRACTOR CAB. VAPOR BUILD UP MAY HAVE OCCURRED BECAUSE OF THE LACK OF WIND. THE WORKER DETECTED AN ODOR AND PUT ON A RESPIRATOR, BUT NO EYE PROTECTION.
1994	196	Possible	Respiratory, Systemic	CHEST TIGHTNESS, COUGHING, SORE THROAT, SOME VOMITING.	A WORKER HAD HIS ASTHMATIC CONDITION WORSEN WHILE HE WAS APPLYING METAM-SODIUM. HE COULD DETECT A METAM-SODIUM ODOR IN HIS ENCLOSED TRACTOR CAB. HE REPORTED HIS ILLNESS TO HIS SUPERVISOR ONLY AFTER HE HAD VOMITED.
1994	303	Definite	Skin	REDNESS, IRRITATION AND EXTREME SWELLING OF THE SKIN ON THE RIGHT FOREARM.	THE OPEN/CLOSE VALVE ON THE BULK METAM-SODIUM TANK WAS BACKWARDS. DURING A TRANSFER, THE TRANSFER HOSE SWELLED DUE TO THE PRESSURE. THE WORKER THOUGHT HE CLOSED THE VALVE. HE PULLED OFF THE CAMLOCK AND METAM-SODIUM SHOT UP HIS RIGHT SLEEVE.
1994	476	Definite	Skin	BURNING SENSATION TO THE RIGHT FOOT.	WORKER WAS LOADING METAM-SODIUM AT THE WORK YARD. SOME OF THE MATERIAL SPILLED ONTO HIS LEATHER BOOTS WHEN HE DISCONNECTED THE HOSE. THE NEXT DAY HIS RIGHT FOOT WAS HOT WITH A RED SPOT. HE FAILED TO WEAR ADEQUATE FOOT PROTECTION AND WAS NOT TRAINED.
1994	564	Definite	Skin	FIRST AND SECOND DEGREE BURNS ON THE TOP OF THE LEFT FOOT.	A WORKER WAS RINSING OUT A SPRAY TANK WHEN HE SPILLED SOME OF THE RINSATE ON HIS RUBBER BOOTS. HE WAS NOT AWARE OF THE TEAR IN HIS LEFT BOOT WHICH ALLOWED THE RINSATE TO CONTACT HIS SKIN. HIS SKIN BEGAN BURNING FOUR DAYS LATER.
1994	571	Probable	Skin	ITCHING RASH ON HANDS AND ARMS.	WORKER WAS FLUSHING DRIP LINES DURING 48-HOUR REENTRY INTERVAL AND NOT WEARING PROTECTIVE EQUIPMENT-SPECIFICALLY NO CHEMICAL RESISTANT GLOVES AND NOT GIVEN AN ORAL WARNING.
1994	653	Definite	Skin	RED, ITCHY RASH ON THE FEET AND ANKLES.	WORKER WAS PREPARING TO MOVE A 400 GALLON METAM-SODIUM TANK TO A NEW LOCATION. WHEN HE DISCONNECTED A

					HOSE (POSSIBLY AT THE 'CAM LOCK') FROM THE TANK, METAM-SODIUM SPILLED ON HIS LEGS AND INSIDE HIS BOOTS. THE CLOSED SYSTEM WAS NOT USED CORRECTLY.
1994	824	Probable	Skin	RED, BLISTERY RASH ON THE FEET, HANDS, WRISTS, FOREARMS, CHIN AND UPPER CHEST.	WORKER CONTAMINATED HIMSELF WHILE TRANSFERING METAM-SODIUM FROM 30-GALLON DRUMS TO 2.5 GALLON CONTAINERS. THE CONTAINERS HAD TO BE TRANSPORTED TO FIELDS WHERE METAM-SODIUM WOULD BE APPLIED THRU THE SPRINKLER IRRIGATION SYSTEM. NO CONTACT WITH EMPLOYEE.
1994	1148	Probable	Respiratory, Systemic	BURNING OF MOUTH AND THROAT, HEADACHE, EXCESS SALIVATION, DIZZINESS.	WORKER DEVELOPED SYMPTOMS WHILE MOVING SPRINKLER IRRIGATION PIPES. TWO CO-WORKERS ALSO EXPERIENCED BURNING OF MOUTH AND THROAT, BUT DID NOT SEE A DOCTOR. WORKER COULD NOT BE LOCATED FOR INTERVIEW.
1995	259	Definite	Skin	RED RASH ON THE TOP OF THE LEFT FOOT.	WHILE TRANSFERRING METAM-SODIUM FROM A BULK TANK TO A STAINLESS STEEL TANK, SOME OF THE LIQUID SPILLED ON THE DELIVERY DRIVER'S LEFT BOOT. HE WASHED THE BOOT OFF, BUT DID NOT CHANGE HIS FOOTWEAR. A RASH DEVELOPED ON THE FOOT THAT EVENING.
1995	1028	Possible	Respiratory, Systemic	HEADACHE, SORE THROAT.	AN EQUIPMENT OPERATOR DISTRIBUTING AND LEVELING STERILIZED OIL ON A GOLF COURSE NOTED THE ODOR OF THE FUMIGANT. HE DEVELOPED SYMPTOMS. HE CONSULTED A PHYSICIAN THREE DAYS LATER.
1995	1288	Probable	Skin, Respiratory, Systemic	LIGHTHEADEDNESS, DIZZINESS, VOMITING, HEADACHE, MUSCLE TREMORS, RASH ON THE ARMS, CHEST TIGHTNESS.	A METAM-SODIUM CONTAINER WAS PUNCTURED DURING TRANSPORTATION. THE SPILL WAS CLEANED UP PRIOR TO DELIVERY. THE TRUCK DRIVER AND TWO TREE SERVICE COMPANY EMPLOYEES BECAME ILL WHILE UNLOADING PALLETS OF METAM-SODIUM CONTAINERS. SEE 95-1450 & 2111.
1995	1450	Probable	Respiratory, Systemic	HEADACHE, DIZZINESS, SCRATCHY THROAT, HEAVY FEELING OF THE EYES.	SEE 95-1288.
1995	1477	Probable	Skin, Systemic	HEADACHE, CRAMPS, NERVOUSNESS, ITCHING.	A DOCK WORKER OPENED A TRAILER AND FOUND ONE 5-GALLON METAM-SODIUM CONTAINER LEAKING. HE ATTEMPTED TO ENTER THE TRAILER, BUT WAS OVERWHELMED BY THE FUMES. THE TRAILER ARRIVED AT ITS DESTINATION THE NEXT DAY WHERE 3 WORKERS WERE EXPOSED. SEE 95-1288.
1995	1677	Definite	Eye, Respiratory, Systemic	EYE IRRITATION, SINUS CONGESTION, SORE THROAT, SHORTNESS OF BREATH, HEADACHE.	220 YDS. 47-SJ-95. FOURTEEN EMPLOYEES OF A MANUFACTURING COMPANY DEVELOPED SYMPTOMS AFTER SMELLING AN ODOR FROM A METAM-SODIUM APPLICATION 1/8 MILE AWAY. AN INVERSION LAYER CONFINED THE VAPOR. THE BUILDING SEEMS TO HAVE TRAPPED IT.
1995	1678	Probable	Eye, Systemic	DIZZINESS, WATERY EYES, IRRITATED EYES, HEADACHE, NAUSEA.	220 YDS. 47-SJ-95. SEE 95-1677.

1995	1679	Probable	Eye, Systemic	WATERY EYES, ITCHY EYES, DROWSINESS, HEADACHE, FATIGUE.	220 YDS. 47-SJ-95. SEE 95-1677.
1995	1680	Definite	Eye, Respiratory	RUNNY NOSE, WATERY EYES, RED EYES.	220 YDS. 47-SJ-95. SEE 95-1677.
1995	1681	Probable	Eye, Respiratory, Systemic	RUNNY NOSE, WATERY EYES, IRRITATED EYES, LIGHTHEADEDNESS.	220 YDS. 47-SJ-95. SEE 95-1677. PATIENT WAS RECEIVING TREATMENT FOR PNEUMONIA AT THE TIME OF EXPOSURE.
1995	1682	Probable	Respiratory	COUGHING, CONGESTION, BURNING IN THE THROAT, TIGHTNESS IN THE CHEST.	220 YDS. 47-SJ-95. SEE 95-1677.
1995	1683	Definite	Eye, Respiratory, Systemic	DIZZINESS, HEADACHE, TIREDNESS, STUFFY NOSE, SORE THROAT, ITCHY EYES.	220 YDS. 47-SJ-95. SEE 95-1677.
1995	1684	Probable	Eye, Respiratory, Systemic	ITCHY EYES, BURNING EYES, SORE THROAT, SLIGHT NAUSEA, HEADACHE.	220 YDS. 47-SJ-95. SEE 95-1677.
1995	1685	Definite	Skin, Eye, Respiratory, Systemic	DRY THROAT, GAGGING, COUGHING, NAUSEA, BURNING OF THE LIPS, RED EYES, HEAVY FEELING OF THE EYES.	220 YDS. 47-SJ-95. SEE 95-1677.
1995	1686	Definite	Eye, Respiratory, Systemic	BURNING EYES, RUNNY NOSE, HEADACHE, LIGHTHEADEDNESS, SORE THROAT, CHEST TIGHTNESS.	220 YDS. 47-SJ-95. SEE 95-1677.
1995	1687	Probable	Eye, Respiratory, Systemic	TIGHTNESS IN THE CHEST, SORE THROAT, EYE IRRITATION, TIREDNESS.	220 YDS. 47-SJ-95. SEE 95-1677. THIS PATIENT IS THE SHIFT SUPERVISOR WHO INVESTIGATED THE SOURCE OF THE ODOR. SHE TOLD THE DOCTOR SHE WORE A RESPIRATOR AND GOGGLES, BUT THEIR TIMING AND EFFECTIVENESS IS NOT DOCUMENTED.
1995	1688	Probable	Eye, Respiratory, Systemic	NAUSEA, SORE THROAT, HEADACHE, RUNNY NOSE, WATERY EYES, LIGHTHEADEDNESS.	220 YDS. 47-SJ-95. SEE 95-1677.
1995	1689	Definite	Eye, Respiratory, Systemic	IRRITATED EYES, ITCHY EYES, HEAVY FEELING OF EYES, RUNNY NOSE, LIGHTHEADEDNESS.	220 YDS. 47-SJ-95. SEE 95-1677.
1995	1690	Definite	Eye, Respiratory, Systemic	EYE IRRITATION, HEADACHE, SINUS CONGESTION, COUGHING, SORE THROAT, TIREDNESS.	220 YDS. 47-SJ-95. SEE 95-1677.
1995	1750	Definite	Skin	BLISTERING AND PAIN ON THE FEET.	A WORKER WAS LOADING METAM-SODIUM WHEN THE DRY COUPLING FAILED AND THE LIQUID SPILLED ONTO HIS FEET. HE HAD LOST HIS RUBBER BOOTS AND WAS NOT GIVEN ANOTHER PAIR. HE DID NOT REPORT THE DERMATITIS ON HIS FEET UNTIL 2

					DAYS LATER & WAS TAKEN TO THE DOCTOR.
1995	1920	Definite	Skin	MINOR TINGLING AND ITCHING ON THE DORSUM OF BOTH FEET AND ANKLES.	EMPLOYEE WAS TRANSFERRING METAM-SODIUM FROM A BULK TANK TO A 5-GALLON CONTAINER. UPON OPENING A VALVE, HE SPLASHED SOME OF THE MATERIAL ONTO HIS BOOTS. THE MATERIAL SOAKED THROUGH HIS BOOTS AND SOCKS. HE THEN WASHED HIS CONTAMINATED FEET WITH WATER.
1995	1937	Definite	Eye, Respiratory	EYE IRRITATION, RED EYES, WATERY EYES, IRRITATED NOSE & THROAT. RED EYES OBSERVED ON EXAM.	1500 YDS. 52-SJ-95. SIX EMPLOYEES AT A MANUFACTURING PLANT WERE EXAMINED AND RELEASED AFTER THEY SMELLED AN ODOR FROM A METAM-SODIUM SPRINKLER APPLICATION TO A FIELD NEARBY. THE APPLICATION WAS CLOSELY MONITORED AND IN COMPLIANCE. SEE 95-1938 TO 1942
1995	1938	Definite	Eye, Respiratory, Systemic	BURNING EYES, WATERY EYES, RUNNY NOSE, SLIGHT HEADACHE. EYES SLIGHTLY RED ON EXAM.	1500 YDS. 52-SJ-95. SEE 95-1937. BY THE TIME THE WORKERS RETURNED FROM MEDICAL EVALUATION (ABOUT TWO HOURS LATER) THE ODOR HAD DISSIPATED AND THEY CONTINUED WORK UNEVENTFULLY.
1995	1939	Definite	Eye, Respiratory	WATERY EYES, BURNING EYES, RUNNY NOSE. EYES MARKEDLY BLOODSHOT ON EXAM.	1500 YDS. 52-SJ-95. SEE 95-1937.
1995	1940	Definite	Eye, Respiratory	WATERY EYES, ITCHY EYES, IRRITATED NOSE. EYES NOTED TO BE BLOODSHOT ON EXAM.	1500 YDS. 52-SJ-95. SEE 95-1937.
1995	1941	Definite	Eye, Respiratory	BURNING EYES, WATERY EYES, RUNNY NOSE. EYES NOTED TO BE MARKEDLY BLOODSHOT ON EXAM.	1500 YDS. 52-SJ-95. SEE 95-1937.
1995	1942	Definite	Eye, Respiratory, Systemic	NAUSEA, VOMITING, EYE IRRITATION, NOSE DISCOMFORT, COUGHING. SOME EYE REDNESS NOTED ON EXAM.	1500 YDS. 52-SJ-95. SEE 95-1937.
1995	2088	Probable	Eye, Systemic	DIZZINESS, BURNING EYES, HEADACHE, NAUSEA.	900 YDS. 51-SJ-95. EIGHT EMPLOYEES AND 11 WARDS AT A CYA FACILITY DEVELOPED SYMPTOMS AFTER SMELLING AN ODOR THAT RESEMBLED SULFUR. IT CAME FROM A SPRINKLER APPLICATION OF METAM-SODIUM TO A FIELD ABOUT A HALF MILE AWAY. SEE 95-2089 TO 2106.
1995	2089	Probable	Eye, Systemic	HEADACHE, BURNING EYES.	900 YDS. 51-SJ-95. SEE 95-2088. THE APPLICATION WAS CLOSELY MONITORED, IN ACCORD WITH PERMIT CONDITIONS. WHEN THE WIND SHIFTED, THE APPLICATION WAS TERMINATED. ODOR BLEW TOWARDS PEOPLE DURING ABOUT 20 MINUTES UNTIL THE LINES CLEARED.
1995	2090	Probable	Respiratory, Systemic	SORE THROAT, DIZZINESS.	900 YDS. 51-SJ-95. SEE 95-2088.
1995	2091	Probable	Eye, Systemic	BURNING EYES, DIZZINESS,	900 YDS. 51-SJ-95. SEE 95-2088.

				NAUSEA, HEADACHE.	
1995	2092	Probable	Skin, Eye, Respiratory, Systemic	BURNING EYES AND SKIN, HEADACHE, SORE THROAT.	900 YDS. 51-SJ-95. SEE 95-2088
1995	2093	Probable	Skin, Eye, Systemic	BURNING EYES & SKIN, DIZZINESS, HEADACHE.	900 YDS. 51-SJ-95. SEE 95-2088.
1995	2094	Definite	Eye, Respiratory, Systemic	RESPIRATORY IRRITATION, EYE IRRITATION, DIZZINESS, NAUSEA.	51-SJ-95. SEE 95-2088.
1995	2095	Probable	Eye, Respiratory, Systemic	RESPIRATORY IRRITATION, EYE IRRITATION, DIZZINESS, NAUSEA.	900 YDS. 51-SJ-95. SEE 95-2088
1995	2096	Probable	Eye, Respiratory, Systemic	RESPIRATORY IRRITATION, EYE IRRITATION, DIZZINESS, NAUSEA.	900 YDS. 51-SJ-95. SEE 95-2088.
1995	2097	Definite	Eye, Respiratory, Systemic	RESPIRATORY IRRITATION, EYE IRRITATION, DIZZINESS, NAUSEA.	51-SJ-95. SEE 95-2088.
1995	2098	Definite	Eye, Respiratory, Systemic	RESPIRATORY IRRITATION, EYE IRRITATION, DIZZINESS, NAUSEA.	51-SJ-95. SEE 95-2088.
1995	2099	Definite	Eye, Respiratory, Systemic	RESPIRATORY IRRITATION, EYE IRRITATION, DIZZINESS, NAUSEA.	51-SJ-95. SEE 95-2088.
1995	2100	Definite	Eye, Respiratory, Systemic	RESPIRATORY IRRITATION, EYE IRRITATION, DIZZINESS, NAUSEA.	51-SJ-95. SEE 95-2088.
1995	2101	Definite	Eye, Respiratory, Systemic	RESPIRATORY IRRITATION, EYE IRRITATION, DIZZINESS, NAUSEA.	51-SJ-95. SEE 95-2088.
1995	2102	Definite	Eye, Respiratory, Systemic	RESPIRATORY IRRITATION, EYE IRRITATION, DIZZINESS, NAUSEA.	51-SJ-95. SEE 95-2088.
1995	2103	Definite	Eye, Respiratory, Systemic	RESPIRATORY IRRITATION, EYE IRRITATION, DIZZINESS, NAUSEA.	51-SJ-95. SEE 95-2088.
1995	2104	Definite	Eye, Respiratory, Systemic	RESPIRATORY IRRITATION, EYE IRRITATION, DIZZINESS, NAUSEA.	51-SJ-95. SEE 95-2088.
1995	2105	Definite	Eye, Respiratory, Systemic	RESPIRATORY IRRITATION, EYE IRRITATION, DIZZINESS, NAUSEA.	51-SJ-95. SEE 95-2088.

1995	2106	Definite	Eye, Respiratory, Systemic	RESPIRATORY IRRITATION, EYE IRRITATION, DIZZINESS, NAUSEA.	51-SJ-95. SEE 95-2088.
1995	2111	Possible	Respiratory	CHEST PAIN.	SEE 95-1288. HE WAS ALSO SUFFERING A BLADDER INFECTION WHEN HE SAW THE DOCTOR.
1996	45	Probable	Skin	BURNING RASH ON BOTH ARMS.	AN APPLICATOR WAS MAKING A TURN AT THE END OF A FIELD WHEN THE WHEEL HIT A LARGE BOULDER CAUSING THE SPRAY TANK LID TO LOOSEN. SOME METAM-SODIUM SPLASHED INTO THE TRACTOR ENGINE FAN. THE FAN MISTED THE PESTICIDE ONTO THE APPLICATOR.
1996	220	Definite	Skin	ITCHY, RED, BURNING AND PEELING SKIN ON THE BACK OF THE LOWER LEGS.	A HOSE FELL OFF OF A NURSE TANK TRUCK. THE DRIVER SPILLED METAM-SODIUM ONTO HIS COVERALLS WHILE PUTTING THE HOSE BACK UP. HIS LEG BEGAN TO ITCH AN HOUR LATER. WHEN THE EXPOSED SKIN PEELED OFF ABOUT 10 DAYS LATER, HE SOUGHT MEDICAL ATTENTION.
1996	253	Definite	Skin, Eye	RED AND BURNING EYES, IRRITATED SKIN.	A FAMILY OF FOUR DEVELOPED SYMPTOMS AFTER DRINKING AND USING CONTAMINATED WELL WATER. THE WELL WAS CONTAMINATED DUE TO A FAULTY CHECK VALVE ON THE AGRICULTURAL WELL. SAMPLES FROM THE DOMESTIC WELL TESTED POSITIVE FOR METAM-SODIUM. SEE 96-254 TO 256.
1996	254	Definite	Skin, Eye, Respiratory, Systemic	BURNING SKIN, RED AND BURNING EYES, BREATHING DIFFICULTY, NAUSEA, DIARRHEA, MUSCLE SPASMS.	SEE 96-253.
1996	255	Definite	Skin, Eye, Systemic	DIARRHEA, INTERMITTENT HEADACHES, EYE IRRITATION, ANAL IRRITATION.	SEE 96-253.
1996	256	Definite	Skin, Systemic	UPSET STOMACH, DIARRHEA, VOMITING, BURNING SENSATION ON THE SKIN.	SEE 96-253.
1996	527	Possible	Eye	RED, IRRITATED AND PAINFUL LEFT EYE.	EMPLOYEES DRILL HOLES IN TELEPHONE POLES BEFORE INJECTING METAM-SODIUM. SOME METAM-SODIUM RAN OUT OF A HOLE AND WAS ABSORBED BY SAWDUST. WHEN HE DISPOSED OF THE SAWDUST AT THE END OF THE DAY, SOME OF IT BLEW BACK INTO HIS LEFT EYE.
1996	805	Definite	Skin	BURNING SENSATION, REDNESS AND BLISTER ON THE TOP OF THE LEFT FOOT.	METAM-SODIUM LEAKED ONTO A WORKER'S LEFT SHOE WHILE HE TREATED A TELEPHONE POLE. HE SUFFERED A BURN ON THE TOP OF THE FOOT. HIS FOREMAN TOOK HIM TO THE DOCTOR WHERE THE FOOT WAS WASHED. HE WAS TRAINED TO USE THE PESTICIDE AFTER HIS EXPOSURE.
1996	1020	Probable	Systemic	DIZZINESS, HEADACHE, ABDOMINAL PAIN, RAPID HEART	A WORKER DELIVERED LIQUID FERTILIZER TO THE WRONG STORAGE TANK. HE PUMPED THE FERTILIZER INTO A METAM-

				BEAT.	SODIUM TANK. WHEN HE CHECKED THE FERTILIZER LEVEL IN THE TANK, HE EXPOSED HIMSELF TO A FOUL ODOR. HE BECAME ILL WHILE RETURNING TO THE OFFICE.
1996	1503	Definite	Skin, Respiratory	ITCHY, RED, BURNING AND BLISTERY RASH ON THE LOWER LEGS, MILD SHORTNESS OF BREATH, COUGHING.	AFTER LOADING METAM-SODIUM INTO HIS SPRAY RIG TANKS, A WORKER DISCONNECTED THE QUICK COUPLER HOSE AND SPILLED SOME MATERIAL ON HIS RUBBER BOOTS. THE NEXT DAY, HE DEVELOPED A BLISTERY RASH WHILE WEARING THE BOOTS TO IRRIGATE FIELDS.
1996	1634	Probable	Eye	ITCHY AND BURNING EYES.	1408 YARDS. 36-SJ-96. WORKERS COMPLAINED OF AN ODOR AND DEVELOPED SYMPTOMS. A PRE-PLANT METAM-SODIUM APPLICATION WAS BEING DONE 0.8 MILE AWAY. A SHIFT IN THE LIGHT WIND AND PROBABLE INVERSION LAYER CONTRIBUTED. SEE 96-2218 TO 2227.
1996	1709	Definite	Skin	SECOND DEGREE BURN ON THE RIGHT LOWER LEG.	WHILE INJECTING METAM-SODIUM INTO TELEPHONE POLES, AN EMPLOYEE APPARENTLY SPILLED A SMALL AMOUNT OF THE CHEMICAL ON HIS PANTS. HE DISCOVERED A SECOND DEGREE CHEMICAL BURN ON HIS RIGHT LOWER LEG THE NEXT DAY AND SAW A DOCTOR THE DAY AFTER THAT.
1996	1713	Probable	Eye	BURNING EYES.	40-FRE-96. WHILE WAITING FOR A BUS, 34 STUDENTS AND ONE ADULT WOMAN WERE EXPOSED TO METAM-SODIUM VAPORS COMING FROM A FIELD 1/8 OF A MILE AWAY. THE BUS DRIVER, TWENTY-SEVEN STUDENTS AND THE WOMAN WERE AFFECTED. SEE 96-1714, 1782, 1865.
1996	1715	Probable	Eye	WATERING, PAINFUL, ITCHING AND BURNING EYES.	40-FRE-96. SEE 96-1713.
1996	1716	Probable	Eye	EYES BURNING.	40-FRE-96. SEE 96-1713.
1996	1718	Probable	Eye	BURNING EYES.	40-FRE-96. SEE 96-1713.
1996	1719	Probable	Eye	IRRITATED AND ITCHING EYES.	40-FRE-96. SEE 96-1713.
1996	1720	Probable	Eye	WATERING AND BURNING EYES.	40-FRE-96. SEE 96-1713.
1996	1721	Probable	Eye, Systemic	STINGING AND WATERY EYES, HEADACHE, RINGING AND PAIN IN THE EARS.	40-FRE-96. SEE 96-1713.
1996	1722	Probable	Eye	SORE, ITCHY AND WATERY EYES.	40-FRE-96. SEE 96-1713.
1996	1723	Probable	Eye	BURNING AND WATERY EYES.	40-FRE-96. SEE 96-1713.
1996	1724	Probable	Eye	MILDLY WATERY EYES.	40-FRE-96. SEE 96-1713.
1996	1725	Probable	Eye	ITCHY, AND WATERY EYES.	40-FRE-96. SEE 96-1713.
1996	1727	Probable	Eye, Systemic	BURNING AND WATERY EYES, ABDOMINAL PAIN, HEADACHE.	40-FRE-96. SEE 96-1713.
1996	1728	Probable	Eye, Systemic	ITCHING, BURNING AND WATERY EYES, HEADACHE.	40-FRE-96. SEE 96-1713.
1996	1729	Probable	Eye	BURNING AND WATERING EYES.	40-FRE-96. SEE 96-1713.

1996	1730	Probable	Eye	BURNING ITCHING EYES.	40-FRE-96. SEE 96-1713.
1996	1731	Probable	Eye	BURNING AND WATERY EYES.	40-FRE-96. SEE 96-1713.
1996	1732	Probable	Eye	BURNING EYES.	40-FRE-96. SEE 96-1713.
1996	1733	Probable	Eye	WATERING, STINGING AND BURNING EYES.	40-FRE-96. SEE 96-1713.
1996	1735	Probable	Eye, Systemic	BURNING EYES, UPSET STOMACH.	40-FRE-96. SEE 96-1713.
1996	1736	Probable	Eye	ITCHY AND WATERY EYES.	40-FRE-96. SEE 96-1713.
1996	1737	Probable	Eye	TEARING, SORE, BURNING EYES.	40-FRE-96. SEE 96-1713.
1996	1739	Probable	Eye	STINGING EYES.	40-FRE-96. SEE 96-1713.
1996	1740	Probable	Eye, Systemic	DIZZINESS, BURNING EYES.	40-FRE-96. SEE 96-1713.
1996	1741	Probable	Eye	WATERING AND BURNING EYES.	40-FRE-96. SEE 96-1713.
1996	1742	Probable	Eye, Systemic	BURNING EYES, NAUSEA, DIFFICULTY BREATHING, ABDOMINAL PAIN.	40-FRE-96. SEE 96-1713.
1996	1744	Probable	Eye, Respiratory	IRRITATED EYES, STINGING IN THE CHEST UPON BREATHING.	40-FRE-96. SEE 96-1713. THE CHILD HAS A HISTORY OF ASTHMA.
1996	1745	Probable	Eye, Systemic	WATERY EYES, STOMACH CRAMPS.	40-FRE-96. SEE 96-1713.
1996	1782	Probable	Eye, Systemic	IRRITATED EYES, LIGHTHEADEDNESS.	40-FRE-96. SEE 96-1713. THIS MAN WAS THE BUS DRIVER. HE WAS EXPOSED WHILE PICKING UP CHILDREN AT THE BUS STOP.
1996	1865	Probable	Eye, Respiratory	BURNING IN THE THROAT AND EYES.	40-FRE-96. SEE 96-1713. THIS WOMAN WAS WAITING FOR THE BUS. SHE WAS ON HER WAY TO WORK WHEN THE EXPOSURE OCCURRED.
1996	2106	Definite	Skin	PAIN, REDNESS, SWELLING AND WARMTH ON THE RIGHT LOWER LEG.	AS A WORKER SET UP THE PESTICIDE INJECTION PUMP ON A SPRINKLER SYSTEM, A SMALL AMOUNT OF METAM-SODIUM LEAKED OUT OF A CONNECTION AND DRIPPED INSIDE HIS RUBBER BOOT. WHEN HIS SKIN BEGAN BURNING, HE REMOVED HIS BOOT & SOCK AND RINSED THE AREA WITH WATER.
1996	2218	Probable	Eye, Respiratory, Systemic	SHORTNESS OF BREATH, EYE IRRITATION, LIGHTHEADEDNESS.	1408 YARDS. 36-SJ-96. SEE 96-1634. UPON RESPONDING TO A CALL, THE FIRE DEPARTMENT STAFF NOTED ONLY A SLIGHT ODOR. THERE WERE FOUR HOUSES LOCATED BETWEEN THE APPLICATION SITE AND THE EMPLOYEE WORK SITE WHOSE RESIDENTS REPORTED NO SYMPTOMS.
1996	2219	Probable	Skin, Respiratory	THROAT AND CHEST TIGHTNESS, BURNING SENSATION ON THE ARMS.	1408 YARDS. 36-SJ-96. SEE 96-1634. THE FIRE DISTRICT STAFF GAVE THE WORKERS OXYGEN, WASHED OUT THEIR EYES AND REASSURED THEM. ONE WORKER SOUGHT MEDICAL ATTENTION A FEW HOURS LATER.
1996	2220	Probable	Eye	WATERY AND BURNING EYES.	1408 YARDS. 36-SJ-96. SEE 96-1634.
1996	2221	Probable	Eye, Systemic	BURNING EYES, ANXIETY.	1408 YARDS. 36-SJ-96. SEE 96-1634.
1996	2222	Probable	Skin, Eye, Respiratory	BURNING EYES, DIFFICULTY BREATHING, BURNING	1408 YARDS. 36-SJ-96. SEE 96-1634.

				SENSATION ON THE ARMS.	
1996	2223	Probable	Eye	BURNING AND, WATERY EYES.	1408 YARDS. 36-SJ-96. SEE 96-1634.
1996	2224	Probable	Respiratory	DIFFICULTY BREATHING, COUGHING.	1408 YARDS. 36-SJ-96. SEE 96-1634.
1996	2225	Probable	Eye, Systemic	BURNING EYES, DIZZINESS, NAUSEA.	1408 YARDS. 36-SJ-96. SEE 96-1634.
1996	2226	Probable	Eye, Systemic	BURNING EYES, DIZZINESS, NAUSEA.	1408 YARDS. 36-SJ-96. SEE 96-1634.
1996	2227	Probable	Eye, Respiratory	BURNING EYES, BREATHING DIFFICULTY.	1408 YARDS. 36-SJ-96. SEE 96-1634.
1997	143	Probable	Skin	RASH ON THE HANDS.	DUE TO AN APPARENT CHEMICAL SENSITIVITY, AN EMPLOYER TOLD AN EMPLOYEE NOT TO USE PESTICIDES. HE DISOBEYED HIS EMPLOYER WHEN HE POURED A WOOD TREATMENT PESTICIDE INTO A SMALL APPLICATION CONTAINER. HE DEVELOPED A RASH THAT EVENING.
1997	175	Probable	Eye, Respiratory	WATERING AND BURNING EYES, DIFFICULTY BREATHING.	WHILE TRANSPORTING METAM-SODIUM DRUMS, A TRUCK DRIVER DETECTED A STRONG ODOR AND DISCOVERED A LEAKING DRUM. HIS SUPERVISOR CLEANED IT UP AND INSTRUCTED HIM TO COMPLETE THE DELIVERY, ALTHOUGH THE WOOD HAD SOAKED UP THE PRODUCT.
1997	216	Probable	Skin	RED AND ITCHY RASH ON THE TOP OF THE FEET.	AS AN APPLICATOR CLEANED A FILTER ON THE APPLICATION TRACTOR, SOME METAM-SODIUM SPILLED ONTO THE TOP OF HIS LEATHER BOOTS. HE DEVELOPED A RASH ON THE TOP OF HIS FEET 2 DAYS LATER. HE SOUGHT MEDICAL ATTENTION THE NEXT DAY.
1997	308	Probable	Skin	RED AND BURNING RASH ON THE WRISTS AND FOREARMS.	WHILE A MECHANIC CHANGED A FILTER IN THE TRANSFER LINE, METAM SODIUM SPILLED ON HIS ARM. THE SLEEVE SEAM OF HIS RAINCOAT MAY HAVE LEAKED . THE MECHANIC REPORTEDLY WORE FULL PROTECTIVE GEAR, BUT ONLY A RAINCOAT IS SPECIFICALLY MENTIONED.
1997	365	Possible	Skin	BURNING, PAIN AND BLISTERS ON THE EARS.	A CREW OF 5 WORKERS WERE UNPLUGGING THE NOZZLES ON A PESTICIDE APPLICATION TRACTOR WHEN EACH GOT SOME OF THE METAM-SODIUM AND FERTILIZER SOLUTION ON THEM. EACH RINSED OFF. ONE DEVELOPED SKIN PROBLEMS AND SAW A DOCTOR 17 DAYS LATER.
1997	376	Definite	Skin	RED AND SWOLLEN RASH ON THE FEET, SHINS, GROIN AND ABDOMEN WITH SMALL PATCHES ON THE HANDS.	A DELIVERY DRIVER SPILLED METAM-SODIUM ON HIS SHOES WHEN HE DISCONNECTED THE FILLING HOSE FROM THE BULK TANK. HE FAILED TO WEAR THE PROVIDED RUBBER BOOTS. HE DELIVERED THE BULK TANK BEFORE DECONTAMINATING HIMSELF. HE DEVELOPED A RASH WITHIN 2 HOURS.
1997	403	Possible	Skin	ITCHING OF THE FACE, HANDS, FOREARMS AND LEGS.	A TRAINED, EXPERIENCED IRRIGATOR WORKED IN NUMEROUS FIELDS, BUT IDENTIFIED AN AREA BEING PREPARED FOR

					TURFGRASS AS THE PLACE HE BEGAN ITCHING. HE COMPLAINED THE FOLLOWING DAY, WHEN THE ITCHING INTENSIFIED.
1997	900	Definite	Skin	RASH AND BLISTERS ON THE TOP OF BOTH FEET.	WHEN A POLE INSPECTOR POURED METAM-SODIUM FROM A 5-GALLON CONTAINER, SOME SPILLED ON HIS BOOTS. HE REMOVED HIS BOOTS & SOCKS BEFORE RINSING HIS FEET WITH WATER. HE THEN PUT THE BOOTS BACK ON. A FEW DAYS LATER, HE DEVELOPED SYMPTOMS AND TOLD HIS BOSS.
1997	1047	Probable	Eye, Respiratory, Systemic	EYE IRRITATION, NAUSEA, VOMITING, DIZZINESS, HEADACHE, COUGHING.	A FIELD WAS FUMIGATED WITH METAM-SODIUM. LATER THAT MORNING, FIVE GRAPE HARVESTERS DEVELOPED SYMPTOMS WHILE WORKING ACROSS THE ROAD FROM THE FIELD. SEE 97-1048 TO 1050 AND 1068.
1997	1048	Probable	Eye, Systemic	TEARING AND BURNING EYES, NAUSEA, DIZZINESS, MILD HEADACHE.	SEE 97-1047. FOUR OF THE WORKERS WERE IN THE 2 ROWS CLOSEST TO THE FIELD. THE FIFTH WORKER WAS ABOUT 100 YARDS AWAY. BY THE TIME THEY SAW A DOCTOR, THEY FELT FINE.
1997	1049	Probable	Eye, Systemic	BURNING EYES, HEADACHE, NAUSEA, DIZZINESS.	SEE 97-1047. THE VINEYARD HAD NOT BEEN SPRAYED FOR ABOUT 2 MONTHS.
1997	1050	Probable	Eye, Respiratory, Systemic	EYE AND THROAT IRRITATION, HEADACHE, NAUSEA, DIZZINESS, HAND NUMBNESS.	SEE 97-1047.
1997	1068	Probable	Eye, Respiratory, Systemic	BURNING EYES, SORE THROAT, NAUSEA, HEADACHE.	SEE 97-1047.
1997	1105	Probable	Skin, Respiratory, Systemic	ITCHY RED RASH ON THE ARMS AND LEGS, DIZZINESS, SOB, SWOLLEN FEET AND HANDS, BLISTERS ON THE LEGS.	WHILE TRANSFERRING METAM-SODIUM INTO A SERVICE CONTAINER, AN EMPLOYEE EXPOSED HIMSELF TWICE WITHIN A 6 DAY PERIOD. POOR LIGHTING AND VENTILATION CONTRIBUTED TO THE EXPOSURE. HE SOUGHT MEDICAL ATTENTION THE DAY AFTER THE FIRST EXPOSURE.
1997	1136	Definite	Skin	PAINFUL, BURNING BLISTER ON THE RIGHT FOOT.	A DELIVERY DRIVER TRANSFERRED METAM-SODIUM FROM HIS TRUCK INTO A FIELD TANK. A FEW DROPS FELL ONTO HIS RIGHT FOOT WHEN HE UNHOOKED THE DRY-DISCONNECT COUPLER. THE NEXT DAY, A BLISTER DEVELOPED ON HIS FOOT. HE FAILED TO WEAR HIS CHEMICAL RESISTANT BOOTS.
1997	1137	Possible	Skin	ITCHY BURN ON THE RIGHT FOREARM.	METAM-SODIUM DRIPPED ONTO A DRIVER'S GLOVE AS HE UNHOOKED A DRY DISCONNECT COUPLER. IT RAN DOWN HIS ARM, SOAKED THROUGH HIS SHIRT SLEEVE AND CONTACTED SKIN STILL HEALING FROM A BURN. HE WASHED UP AND SAW A DOCTOR TO HAVE THE BURN TENDED.
1997	1170	Probable	Eye, Respiratory, Systemic	HEADACHE, NAUSEA, DIZZINESS, SHORTNESS OF BREATH, BURNING IN THE EYES, THROAT, DRY MOUTH.	A WOOD PRESERVATIVE SPILLED IN THE BACK OF A TRUCK. TWO WORKERS ADDED KITTY LITTER TO ABSORB THE SPILL AND CLEANED IT UP. THEY DEVELOPED SYMPTOMS AND WERE TAKEN TO A HOSPITAL WHERE THEY WERE DECONTAMINATED AND

					OBSERVED. SEE 97-1171.
1997	1171	Probable	Eye, Respiratory, Systemic	HEADACHE, DIZZINESS, NAUSEA, BURNING EYES AND THROAT, FATIGUE, SEEING SPOTS.	SEE 97-1170. THIS WORKER HAS LEFT HIS JOB AT THE WOOD TREATMENT COMPANY AND COULD NOT BE LOCATED FOR AN INTERVIEW.
1997	1514	Possible	Skin	RASH ON BOTH ARMS, LEGS AND ABDOMEN.	AN APPLICATOR POURED METAM-SODIUM THROUGH A TUBE INTO HOLES DRILLED IN UTILITY POLES. DESPITE WEARING PROTECTIVE EQUIPMENT, HE DEVELOPED A RASH. HE SOUGHT MEDICAL ATTENTION THE NEXT DAY. HIS PROLONGED DISABILITY MAY NOT BE RELATED TO THE INJURY.
1997	1651	Definite	Skin, Eye	PAIN, TEARING, PHOTOPHOBIA, AND SCLERAL BURN OF THE LEFT EYE, ITCHY AND IRRITATED SKIN BELOW THE EYE	TWO DROPS OF METAM-SODIUM SPLASHED INTO AN IRRIGATOR'S FACE FROM A HOSE BEING COILED FOR STORAGE BY ANOTHER WORKER. HE IMMEDIATELY RINSED HIS FACE AND EYE WITH WATER BEFORE SEEKING MEDICAL ATTENTION.
1997	1661	Definite	Skin, Systemic	HEADACHE, BURNING SENSATION ON THE HANDS.	A PESTICIDE DELIVERY DRIVER WAS ASSISTING AN APPLICATOR IN UNPLUGGING THE APPLICATION EQUIPMENT WHEN A HOSE CLAMP FAILED. HE GOT DOUSED WITH METAM-SODIUM, BUT DID NOT CHANGE CLOTHES. HE DEVELOPED SYMPTOMS A SHORT TIME LATER.
1997	1811	Probable	Skin, Respiratory, Systemic	ITCHY SKIN, BURNING AND RUNNY NOSE, SORE THROAT, ABDOMINAL PAIN, NAUSEA, VOMITING, DIARRHEA.	34-KER-97. SEVERAL HOUSEHOLDS DEVELOPED SYMPTOMS A FEW MINUTES AFTER THE PRE-PLANT SHANK APPLICATION OF METAM-SODIUM TO A FIELD. NO ONE SOUGHT MEDICAL ATTENTION BUT MOST OF THEM DEVELOPED IRRITANT SYMPTOMS. NO VIOLATIONS ON THE PERMIT CONDITIONS.
1997	1812	Possible	Skin, Respiratory	RASH ON THE LEGS, WHEEZING.	34-KER-97. SEE 1997-1811. THIS INFANT'S SYMPTOMS WERE OBSERVED BY HIS FATHER AND THE INTERVIEW WAS DONE BY PROXY.
1997	1813	Probable	Eye	WATERY EYES.	34-KER-97. SEE 1997-1811.
1997	1815	Probable	Eye, Respiratory	SLIGHT EYE IRRITATION AND SLIGHT CHEST TIGHTNESS.	34-KER-97. SEE 1997-1811. THIS PERSON RELAYED HER SYMPTOMS BY CALLING THE CAC OFFICE.
1997	1816	Possible	Respiratory	CHEST TIGHTNESS.	34-KER-97. SEE 1997-1811. HIS SYMPTOMS WERE REPORTED BY HIS MOTHER THROUGH CALLING THE CAC OFFICE.
1997	1817	Probable	Eye	EYE IRRITATION.	34-KER-97. SEE 1997-1811.
1997	1818	Possible	Eye, Respiratory	CHEST PAIN, SHORTNESS OF BREATH, EYE AND THROAT IRRITATION.	34-KER-97. SEE 1997-1811. THIS PERSON SOUGHT MEDICAL ATTENTION FOR HER SYMPTOMS. HOWEVER, SHE LIVED 2.6 MILES AWAY FROM THE APPLICATION SITE.
1997	1819	Probable	Eye, Respiratory	BURNING EYES, THROAT IRRITATION.	34-KER-97. SEE 1997-1811. THIS PERSON WAS OPENING DOORS WHEN HE SMELLED AN ODOR AND DEVELOPED SYMPTOMS. HE WAS THE FIRST ONE TO BE EVACUATED.
1997	1820	Probable	Respiratory	DIFFICULTY BREATHING.	34-KER-97. SEE 1997-1811. THIS PERSON WAS DRIVING THROUGH AND DEVELOPED SYMPTOMS. INFORMATION WAS FROM A PHONE CALL FROM THE HUSBAND.
1997	1822	Probable	Eye,	BURNING IN EYES, SORE THROAT,	34-KER-97. SEE 1997-1811.

			Respiratory	DIFFICULTY BREATHING.	
1997	1824	Probable	Eye, Respiratory, Systemic	SNEEZING, BURNING IN THE NOSE, HEADACHE, EYE IRRITATION.	34-KER-97. SEE 1997-1811.
1997	1825	Probable	Eye, Respiratory	SHORTNESS OF BREATH, SORE THROAT, BURNING IN EYES.	34-KER-97. SEE 1997-1811.
1997	1826	Possible	Eye, Respiratory, Systemic	NASAL IRRITATION, HEADACHE, IRRITATION OF EYES .	34-KER-97. SEE 1997-1811.
1997	1827	Possible	Respiratory	SORE THROAT, COUGH.	34-KER-97. SEE 1997-1811. THIS PERSON REPORTED THE INCIDENT TO THE FIRE DEPARTMENT AFTER SEEING A NEIGHBOR ON TV DISCUSSING PROBLEMS WITH THE APPLICATION. THE REST OF HER FAMILY DID NOT HAVE SYMPTOMS.
1997	1832	Probable	Eye, Respiratory, Systemic	IRRITATED EYES, AGITATION, DISORIENTATION, DIZZINESS, SORE THROAT, RUNNY NOSE.	34-KER-97. SEE 1997-1811.
1997	1833	Probable	Skin, Eye, Systemic	NAUSEA, VOMITING, EYE IRRITATION, FEELING SOMETHING CRAWLING ON THE SKIN.	34-KER-97. SEE 1997-1811.
1997	1834	Probable	Eye, Systemic	TEARING, HEADACHE.	34-KER-97. SEE 1997-1811. AS HE GOT IN THE CAR AND DROVE TO WORK AT 9 PM, HE DEVELOPED SYMPTOMS.
1997	1835	Probable	Eye	TEARING.	34-KER-97. SEE 1997-1811. THIS PERSON WAS 8 MONTHS PREGNANT.
1997	1836	Probable	Eye, Systemic	DISSINCESS, EYE IRRITATION.	34-KER-97. SEE 1997-1811. THIS PERSON HAS CHRONIC OBSTRUCTIVE PULMONARY DISEASE.
1997	1837	Probable	Eye, Respiratory, Systemic	EYE IRRITATION, DIZZINESS, SORE THROAT, LOWER ABDOMINAL PAIN LATER ON.	34-KER-97. SEE 1997-1811. THIS PERSON WAS SEEN BY HER OB-GYN AND WAS DIAGNOSED TO HAVE PREMATURE LABOR CONTRACTIONS. SHE WAS TREATED FOR THAT CONDITION AND RELEASED.
1997	1839	Probable	Eye, Respiratory, Systemic	EYE IRRITATION, RUNNY NOSE, COUGH, SORE THROAT, WHEEZING, DIARRHEA, HEADACHE.	34-KER-97. SEE 1997-1811.
1997	1842	Probable	Skin, Eye, Respiratory, Systemic	BURNING OF THE SKIN, NASAL IRRITATION, SORE THROAT, COUGH, DIARRHEA, HEADACHE, EYE IRRITATION.	34-KER-97. SEE 1997-1811.
1997	1843	Possible	Respiratory	SNEEZING, STUFFY NOSE, CONGESTION, IRRITATED THROAT.	34-KER-97. SEE 1997-1811. THIS PERSON'S INFORMATION WAS RELAYED BY ANOTHER PERSON.
1997	1844	Probable	Eye	BURNING IN THE EYES.	34-KER-97. SEE 1997-1811.
1997	1845	Probable	Eye	BURNING AND WATERY EYES.	34-KER-97. SEE 1997-1811.

1997	1850	Possible	Systemic	HEADACHE.	34-KER-97. SEE 1997-1811.
1997	1851	Probable	Eye, Respiratory	RUNNY NOSE, EYE IRRITATION.	34-KER-97. SEE 1997-1811.
1997	1852	Probable	Eye	EYE IRRITATION.	34-KER-97. SEE 1997-1811.
1997	1853	Probable	Eye, Respiratory	BURNING OF THE NOSE, EYE IRRITATION.	34-KER-97. SEE 1997-1811. THIS WAS ONE OF THE EMERGENCY PERSONNEL WHO RESPONDED TO THE CALL.
1997	1854	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	34-KER-97. SEE 1997-1811. THIS WAS ALSO ONE OF THE EMERGENCY PERSONNEL.
1997	1855	Probable	Eye	EYE IRRITATION AND BURNING.	34-KER-97. SEE 1997-1811.
1997	1856	Probable	Eye	BURNING OF THE EYES.	34-KER-97. SEE 1997-1811.
1997	1857	Probable	Eye	EYE IRRITATION.	34-KER-97. 1997-1811.
1997	1858	Probable	Eye	SEVERE, BURNING EYES.	34-KER-97. SEE 1997-1811.
1997	1859	Probable	Eye	EYE IRRITATION.	34-KER-97. SEE 1997-1811.
1998	788	Probable	Skin	PAIN, BURNING AND 2 SMALL PATCHES OF SKIN LOSS ON THE LEFT HAND.	AN EMPLOYEE PUT ON PROTECTIVE GEAR TO TREAT A WOODEN ELECTRIC POLE. APPARENTLY, SOME CRYSTALIZED LIQUID FUMIGANT REMAINED IN ONE GLOVE HE WORE. THE CHEMICAL REACTED WITH HIS SWEAT AND BURNED HIS LEFT HAND.
1998	799	Probable	Skin, Eye	BURNING EYES, ITCHY RASH ON THE FACE, FACIAL PAIN INCREASED BY SUNLIGHT.	A RESIDENT SMELLED A 'ROTTEN EGG' ODOR ENTERING HIS HOME VIA THE EVAPORATIVE COOLER. ONE GROWER SAID HE HAD COMPLETED HIS APPLICATION AND POINTED OUT ANOTHER GROWER WITH A SPRINKLER APPLICATION IN PROGRESS. THE ODOR CAME FROM THIS APPLICATION.
1998	823	Probable	Eye, Respiratory	BURNING SENSATION IN THE EYES, NOSE AND THROAT.	A VIAL OF FUMIGANT FELL FROM A TELEPHONE POLE BEING REPLACED. THE POLE HAD BEEN TREATED 7 TO 8 MONTHS EARLIER (EXACT DATE NOT AVAILABLE). AS A WORKER HANDLED THE POLE, HE INHALED THE FUMES AND EXPERIENCED SYMPTOMS TYPICAL OF EXPOSURE TO THIS PESTICIDE.
1998	887	Possible	Eye, Respiratory, Systemic	BLURRED VISION, DIZZINESS, TREMORS, TIGHT AND IRRITATED THROAT, DIFFICULTY BREATHING, VOMITING, NAUSEA, SLIGHT HEADACHE, IRRITATED AND WATERY EYES.	30 YARDS. ONE OF 4 IRRIGATORS DEVELOPED SYMPTOMS AFTER WORKING IN A FIELD ADJACENT TO A PRE-PLANT SOIL FUMIGATION. HE DID NOT MENTION HIS SYMPTOMS AT WORK, BUT SOUGHT MEDICAL ATTENTION AFTER WORK. THE DOCTOR HOSPITALIZED HIM OVERNIGHT FOR REHYDRATION.
1998	933	Probable	Skin, Eye	FLAT, RED AND ITCHY RASH ON THE PALMS OF THE HANDS, SOLES OF THE FEET AND LOWER LEGS, RED EYES.	A WORKER APPLIED A LIQUID FUMIGANT BY CHEMIGATION TO A FIELD. AS HE WENT TO REPAIR A BROKEN PIPE, HIS BOOTS STUCK IN THE FLOODED GROUND AND HE FELL INTO THE CONTAMINATED WATER. HE FINISHED A NIGHT-LONG SHIFT BEFORE CHANGING INTO CLEAN CLOTHING.
1999	388	Definite	Skin	RED AND IRRITATED SKIN ON THE FACE, NOSE AND UPPER SHOULDER.	LATE IN THE AFTERNOON, A SHOP WELDER DROVE A SPRAY RIG LOADED WITH METAM-SODIUM TO A FIELD. HE ACCIDENTALLY HIT THE PTO LEVER CAUSING METAM-SODIUM TO SPRAY ON HIM.

					HE IMMEDIATELY FLUSHED THE EXPOSED SKIN WITH WATER AND SAW A DOCTOR THE NEXT MORNING.
1999	489	Probable	Respiratory, Systemic	BURNING THROAT, HEADACHE.	25-SB-99. THE ODOR FROM VARIOUS METAM-SODIUM APPLICATIONS AFFECTED 2 BUSINESS OWNERS AND THEIR CHILDREN WHILE AT THE SHOP. TWO DAYS LATER, SIMILAR ODORS AFFECTED CHILDREN AND STAFF AT A NEARBY ELEMENTARY SCHOOL. SEE 1999-1169 TO 1175.
1999	576	Possible	Skin, Respiratory, Systemic	HEADACHE, SKIN TINGLING, SENSATION DESCRIBED AS RESEMBLING 'BEN-GAY IN THE BLOOD', THROAT IRRITATION, SHORTNESS OF BREATH, TASTE IN THE MOUTH.	A RESIDENT NOTICED AN ODOR THAT HE IDENTIFIED AS COMING FROM A POWER POLE. VIALS OF MITC HAD BEEN PLACED IN THE POLE MORE THAN 5 MONTHS EARLIER. BY THE NEXT DAY, THE ODOR DISSIPATED. THE RESIDENT'S DOG WAS ALSO AFFECTED.
1999	622	Probable	Systemic	NAUSEA, VOMITING, DIZZINESS, SLIGHT NUMBNESS AROUND LIPS, MILD CHEST PAIN RADIATING TO LEFT ARM.	AN IRRIGATOR INEXPLICABLY IGNORED INSTRUCTIONS TO AVOID EXPOSURE TO METAM-SODIUM ODORS WHICH IS SENSTIVE TO. HE ASSISTED CO-WORKERS WITH THE WATER RUN TO SEAL METAM-SODIUM INTO THE SOIL. HE SMELLED THE ODOR & DEVELOPED SYMPTOMS, AS HE OFTEN HAS BEFORE.
1999	659	Probable	Systemic	NAUSEA.	AN IRRIGATOR NOTICED AN UNUSUALLY STRONG ODOR & BECAME NAUSEATED WHILE MONITORING THE SPRINKLER IRRIGATION AFTER A METAM-SODIUM APPLICATION. HE HAS DONE THIS FOR THE PREVIOUS 3 YEARS WITHOUT A PROBLEM. HE DEVELOPED AN UNRELATED RASH SEVERAL DAYS LATER.
1999	1093	Possible	Skin	ITCHY, RED AND SWOLLEN RASH ON THE HANDS AND FEET.	A RESEARCH FACILITY EMPLOYEE DEVELOPED A RASH AFTER SHE TRANSPORTED EMPTY PESTICIDE CONTAINERS TO A DUMP FOR DISPOSAL. THE RASH WAS CONFINED TO SKIN ON THE HANDS COVERED BY LATEX GLOVES AND FEET COVERED BY SHOES. SHE SAW A DOCTOR 5 DAYS LATER.
1999	1169	Probable	Respiratory, Systemic	BURNING THROAT, HEADACHE.	25-SB-99. SEE 1999-489. ON THE NIGHT OF THE FAMILY'S EXPOSURE, THE WIND BLEW THE ODOR FROM THE FIELD TOWARD THE AUTOMOTIVE GARAGE APPROXIMATELY 0.5 MILES AWAY. FIVE OF THE 6 FAMILY MEMBERS SUFFERED SYMPTOMS AND SAW A DOCTOR 2 DAYS LATER.
1999	1170	Probable	Respiratory	BURNING THROAT, COUGHING, SINUS INFECTION.	25-SB-99. SEE 1999-489.
1999	1171	Probable	Respiratory, Systemic	HEADACHE, DRY AND BURNING THROAT, COUGHING.	25-SB-99. SEE 1999-489.
1999	1172	Probable	Respiratory, Systemic	HEADACHE, DRY AND BURNING THROAT, COUGHING.	25-SB-99. SEE 1999-489.
1999	1173	Possible	Skin, Eye, Respiratory	HEADACHE, NAUSEA, RASH ON THE ARM AND LEG, EYE IRRITATION.	25-SB-99. SEE 1999-489. THIS STUDENT APPARENTLY SUFFERED SOME OR ALL THESE SYMPTOMS BEFORE THE DAY OF THE INCIDENT AT SCHOOL. THERE IS NO WAY TO DETERMINE ODOR

					EFFECT ON HER SYMPTOMS.
1999	1174	Probable	Respiratory	COUGHING.	25-SB-99. SEE 1999-489. THIS CHILD HAS CHRONIC ALLEGIES AND ASTHMA WHICH BECAME MORE PRONOUNCED ON THE DAY OF THE INCIDENT.
1999	1175	Probable	Respiratory, Systemic	DIFFICULTY BREATHING, COUGHING, HEADACHE.	25-SB-99. SEE 1999-489.
1999	1207	Probable	Skin	BURNING SENSATION ON THE FACE AND IN THE MOUTH.	A FAULTY VALVE ALLOWED METAM SODIUM APPLIED TO ONE FIELD TO LEAK INTO THE WATER SUPPLY FOR AN ADJACENT FIELD. WHEN AN IRRIGATOR OPENED A VALVE TO THE ADJACENT FIELD, A SEAL BLEW AND SPRAYED CONTAMINATED WATER IN HIS FACE. HE IMMEDIATELY RINSED HIS FACE.
1999	1227	Probable	Skin, Eye, Respiratory, Systemic	EYE, NOSE AND THROAT IRRITATION, SWELLING OF THE FACE, FATIGUE.	53-TUL-99. OVER 100 PEOPLE WERE EVACUATED FROM THEIR HOMES AFTER THE RESIDENTS SMELLED A CHEMICAL ODOR FROM A NEARBY METAM-SODIUM SPRINKLER APPLICATION. SEE 1999-1234 TO 1256, 1303 - 1312, 1488 - 1626. THIS RESIDENT SAW HER DOCTOR TWO DAYS LATER.
1999	1234	Probable	Eye, Respiratory, Systemic	EYE, NOSE AND THROAT IRRITATION, HEADACHE, NAUSEA, SLEEPING DIFFICULTY.	53-TUL-99. SEE 1999-1227. THE APPLICATOR APPLIED AN INADEQUATE WATER SEAL AFTER SOME EARLY SETS. PROBLEMS BEGAN WITH THE FINAL SET, WHEN THE WIND DIRECTION CHANGED AND A WEATHER INVERSION DEVELOPED.
1999	1235	Probable	Skin, Respiratory, Systemic	HEADACHE, NAUSEA, TRANSIENT SHORTNESS OF BREATH, BURNING PAIN IN THE CHEST, THROAT IRRITATION, RASH.	53-TUL-99. SEE 1999-1227. THE APPLICATOR CONTINUED THE APPLICATION IN SPITE OF UNFAVORABLE CONDITIONS AND PROXIMITY TO DWELLINGS. ON INTERVIEW, THIS PERSON REPORTED DEVELOPING A RASH, BUT THE MEDICAL RECORDS DO NOT MENTION IT.
1999	1236	Probable	Eye, Respiratory, Systemic	BURNING AND WATERY EYES, NAUSEA, VOMITING, HEADACHE, STOMACH ACHE, BURNING THROAT.	53-TUL-99. SEE 1999-1227.
1999	1237	Possible	Respiratory, Systemic	PAIN DURING BREATHING, CHEST PAIN, SHORTNESS OF BREATH, VOMITING.	53-TUL-99. SEE 1999-1227.
1999	1238	Probable	Eye, Respiratory	BURNING EYES, NOSE AND THROAT.	53-TUL-99. SEE 1999-1227.
1999	1239	Probable	Eye, Respiratory	BURNING EYES, NOSE AND THROAT, SHORTNESS OF BREATH.	53-TUL-99. SEE 1999-1227. THIS PERSON ALSO HAS A HISTORY OF EMPHYSEMA, ASTHMA AND BRONCHITIS, TO THE EXTENT OF USING OXYGEN AT HOME. EXPOSURE EXACERBATED A SERIOUS MEDICAL CONDITION.
1999	1240	Probable	Eye, Respiratory, Systemic	SORE AND BURNING THROAT, BURNING EYES, TRANSIENT SHORTNESS OF BREATH, NAUSEA, HEADACHE.	53-TUL-99. SEE 1999-1227. THIS PERSON ALSO SUFFERS FROM HYPERTENSION AND AN IRREGULAR HEART BEAT FOR WHICH SHE TAKES MEDICATION.

1999	1241	Probable	Eye, Respiratory, Systemic	BURNING EYES, TRANSIENT SHORTNESS OF BREATH, NAUSEA.	53-TUL-99. SEE 1999-1227. THIS BOY WAS PLAYING OUTSIDE IN HIS AUNT'S YARD.
1999	1242	Probable	Respiratory, Systemic	SHORTNESS OF BREATH, SLIGHT WHEEZING, CHEST PAIN, THROAT IRRITATION, COUGHING UP SALIVA, HEADACHE.	53-TUL-99. SEE 1999-1227. THIS WOMAN HAS A HISTORY OF ASTHMA.
1999	1243	Probable	Eye, Respiratory, Systemic	ITCHY AND WATERY EYES, PAIN AND BURNING IN THE THROAT, NAUSEA, VOMITING, DIARRHEA, ABDOMINAL PAIN, HEADACHE. MEDICAL INTERVIEW ELICETED HISTORY OF SYSTEMIC LUPUS ERYTHEMATOSUS.	53-TUL-99. SEE 1999-1227.
1999	1244	Probable	Skin, Eye, Respiratory, Systemic	HEADACHE, NAUSEA, BURNING EYES, TRANSIENT SHORTNESS OF BREATH, RASH.	53-TUL-99. SEE 1999-1227. THIS BOY WAS PLAYING OUTSIDE WHEN HE DEVELOPED SYMPTOMS. HE REPORTED THAT 3 DAYS LATER A RASH DEVELOPED.
1999	1245	Probable	Eye, Respiratory, Systemic	HEADACHE, STINGING EYES, TRANSIENT SHORTNESS OF BREATH, SLIGHT NASAL IRRITATION.	53-TUL-99. SEE 1999-1227. THIS BOY WAS PLAYING SOCCER IN THE FRONT YARD WITH HIS BROTHERS AND FRIENDS.
1999	1246	Probable	Eye, Respiratory, Systemic	BURNING EYES, HEADACHE, VOMITING, TRANSIENT SHORTNESS OF BREATH, NAUSEA.	53-TUL-99. SEE 1999-1227. AS THIS WOMAN WALKED OUT A STORE, SHE SMELLED AN ODOR. WHEN SHE GOT HOME, SHE DEVELOPED ADDITIONAL SYMPTOMS BEFORE THE SHERIFF EVACUATED HER FAMILY.
1999	1247	Probable	Skin, Eye, Respiratory, Systemic	REPORTED: COUGHING BLOOD, VOMITING, ITCHY RASH ON THE TRUNK, RED AND IRRITATED EYES, CHEST PAIN, SHORTNESS OF BREATH, CONGESTION. EXAM THE DAY AFTER EXPOSURE NOTED ONLY SCRATCH MARKS FROM ITCHING.	53-TUL-99. SEE 1999-1227. THIS SECURITY GUARD WORKED AT A LOCAL BUSINESS, WHERE HE WAS EXPOSED THROUGHOUT HIS SHIFT. HE SOUGHT MEDICAL ATTENTION THE NEXT DAY.
1999	1248	Probable	Eye, Respiratory, Systemic	LIGHTHEADEDNESS, NAUSEA, DIZZINESS, WATERY EYES, SHORTNESS OF BREATH, WHEEZING, METALLIC TASTE IN THE MOUTH.	53-TUL-99. SEE 1999-1227. THIS PARAMEDIC DROVE AN AMBULANCE THAT TRANSPORTED PEOPLE TO AREA HOSPITALS. HE WAS EXPOSED FOR ABOUT FOUR HOURS. HIS SYMPTOMS RESOLVED RAPIDLY WHEN HE WAS REMOVED FROM EXPOSURE AND DECONTAMINATED.
1999	1249	Probable	Respiratory, Systemic	NAUSEA, BRONCHIAL IRRITATION, SHORTNESS OF BREATH, OCCASSIONAL SCATTERED WHEEZING, COUGHING, MILD CHEST PAIN,	53-TUL-99. SEE 1999-1227. THIS WOMAN WORKED AS A SECURITY GUARD AT THE SCHOOL. SHE HAS A HISTORY OF BRONCHITIS, DIABETES AND AN UNSPECIFIED CARDIAC CONDITION.

				ELEVATED BLOOD PRESSURE.	
1999	1250	Possible	Systemic	DIZZINESS, NAUSEA, VOMITING, CHILLS, HEADACHE, WEAKNESS, CHEST PAIN.	53-TUL-99. SEE 1999-1227. THIS WOMAN HAS A HISTORY OF HYPERTENSION. SHE SOUGHT MEDICAL ATTENTION THE DAY AFTER EXPOSURE.
1999	1251	Probable	Eye, Respiratory	WATERY EYES, RESIRATORY IRRITATION, COUGHING, SHORTNESS OF BREATH.	53-TUL-99. SEE 1999-1227. THIS EMERGENCY MEDICAL TECHNICIAN DEVELOPED SYMPTOMS WHILE ASSISTING PEOPLE DURING THE EVACUATION FOR ABOUT FOUR HOURS. HIS SYMPTOMS DISSIPATED BY THE TIME HE SOUGHT MEDICAL ATTENTION THAT EVENING.
1999	1252	Probable	Respiratory, Systemic	HEADACHE, VOMITING, HYPERTENSION, BURNING IN THE THROAT, SHORTNESS OF BREATH, CHEST PAIN, COUGHING. SYMPTOMS SUBSIDED AFTER ARRIVAL AT THE HOSPITAL.	53-TUL-99. SEE 1999-1227. THIS RESIDENT REPORTED SEEING A FOG APPROACH JUST BEFORE EVACUATION. SHE SUFFERS FROM PREEXISTING CONDITIONS OF HIGH BLOOD PRESSURE AND ASTHMA, BOTH OF WHICH MAY HAVE BEEN EXACERBATED BY THE EXPOSURE.
1999	1253	Possible	Respiratory, Systemic	MILD SHORTNESS OF BREATH, HYPERTENSION, ANXIETY.	53-TUL-99. SEE 1999-1227. THIS WOMAN TOOK MEDICATION FOR HYPERTENSION PRIOR TO EXPOSURE.
1999	1254	Probable	Eye, Respiratory, Systemic	BURNING EYES, HEADACHE, NAUSEA, TRANSIENT SHORTNESS OF BREATH.	53-TUL-99. SEE 1999-1227. AT THE TIME OF EXPOSURE, THIS BOY WAS PLAYING OUTSIDE AT A FRIEND'S HOUSE. HIS HEADACHE PERSISTED FOR SEVERAL DAYS; OTHER SYMPTOMS SUBSIDED.
1999	1255	Possible	Respiratory, Systemic	HEADACHE, NAUSEA, DIZZINESS, DIFFICULTY BREATHING.	53-TUL-99. SEE 1999-1227. THIS RESIDENT LIVES ABOUT A MILE FROM THE APPLICATION SITE. HE REPORTED SMELLING A FOUL ODOR, BUT DEVELOPED ONLY MILD SYMPTOMS, WHICH RESOLVED RAPIDLY.
1999	1256	Probable	Eye, Respiratory, Systemic	RED AND BURNING EYES, PHOTOPHOBIA, ITCHY THROAT, TRANSIENT SHORTNESS OF BREATH, HEADACHE, NAUSEA.	53-TUL-99. SEE 1999-1227.
1999	1303	Probable	Eye, Respiratory, Systemic	VOMITING, HEADACHE, NAUSEA, DIZZINESS, BURNING AND IRRITATED EYES, SHORTNESS OF BREATH, NOSE AND THROAT IRRITATION.	53-TUL-99. SEE 1999-1227. THIS BOY'S MOTHER (1999-1304) PROVIDED INFORMATION RELATING TO HERSELF AND HER THREE CHILDREN (1999-1303, 1305, & 1306). THE SAME SYMPTOMS ARE LISTED FOR EACH.
1999	1304	Probable	Eye, Respiratory, Systemic	VOMITING, NAUSEA, DIZZINESS, BURNING EYES, NOSE AND THROAT IRRITATION, DIFFICULTY BREATHING.	53-TUL-99. SEE 1999-1227.
1999	1305	Probable	Eye, Respiratory, Systemic	BURNING AND IRRITATED EYES, HEADACHE, NAUSEA, DIZZINESS, VOMITING, NOSE AND THROAT IRRITATION, SHORTNESS OF BREATH, DIFFICULTY	53-TUL-99. SEE 1999-1227. AT THE TIME OF THE INCIDENT, THIS CHILD HAD CHICKEN POX.

				BREATHING.	
1999	1306	Probable	Eye, Respiratory, Systemic	BURNING AND IRRITATED EYES, HEADACHE, NAUSEA, DIZZINESS, VOMITING, NOSE AND THROAT IRRITATION, SHORTNESS OF BREATH.	53-TUL-99. SEE 1999-1227.
1999	1307	Possible	Respiratory, Systemic	HEADACHE, DIFFICULTY BREATHING.	53-TUL-99. SEE 1999-1227. FOUR-YEAR-OLD CHILD NOTED TO BE WET AND COLD FOLLOWING DECONTAMINATION.
1999	1308	Possible	Eye, Systemic	CRYING A LOT.	53-TUL-99. SEE 1999-1227. THE PARENTS OF THIS INFANT BOY DID NOT KNOW IF HE HAD SYMPTOMS OR NOT, BUT REPORTED HE WAS CRYING A LOT.
1999	1309	Probable	Eye, Respiratory, Systemic	DIZZINESS, HEADACHE, NAUSEA, VOMITING, DIFFICULTY BREATHING, EYE IRRITATION.	53-TUL-99. SEE 1999-1227. THIS ADOLESCENT EXPRESSED NO COMPLAINTS TO MEDICAL STAFF APART FROM BEING WET AND COLD FOLLOWING DECONTAMINATION.
1999	1310	Possible	Systemic	HEADACHE, DIZZINESS, NAUSEA.	53-TUL-99. SEE 1999-1227.
1999	1311	Probable	Skin, Respiratory, Systemic	DIFFICULTY BREATHING, DIZZINESS, STOMACH PROBLEMS, NAUSEA, HEADACHE, SKIN RASH.	53-TUL-99. SEE 1999-1227. THIS WOMAN REPORTED A RASH SHE DESCRIBED AS LOOKING LIKE CHICKEN POX. SHE WAS NOTED TO BE SHIVERING WITH COLD FOLLOWING DECONTAMINATION.
1999	1312	Probable	Respiratory, Systemic	DIZZINESS, HEADACHE, NAUSEA, WEAKNESS, DIFFICULTY BREATHING.	53-TUL-99. SEE 1999-1227.
1999	1488	Probable	Eye, Respiratory, Systemic	BURNING EYES AND THROAT, HEADACHE, DIARRHEA.	53-TUL-99. SEE 1999-1227. THIS RESIDENT SPECIFIED THAT HIS IRRITANT SYMPTOMS SUBSIDED, BUT HE CONTINUED TO EXPERIENCE HEADACHE AND DIARRHEA NINE DAYS AFTER EXPOSURE. DIARRHEA IS NOT A TYPICAL SYMPTOM AND MAY HAVE ANOTHER CAUSE.
1999	1489	Probable	Eye, Respiratory	BURNING EYES, DIZZINESS, DRY THROAT.	53-TUL-99. SEE 1999-1227.
1999	1490	Probable	Eye, Respiratory, Systemic	BURNING EYES, COUGHING, STOMACH ACHE.	53-TUL-99. SEE 1999-1227.
1999	1491	Probable	Eye, Systemic	HEADACHE, DIZZINESS, NAUSEA, DIARRHEA, STOMACH ACHE, BURNING EYES.	53-TUL-99. SEE 1999-1227. RESIDENT REPORTED SEEING 'MIST OF FOG ABOUT 5 FEET HIGH'.
1999	1492	Probable	Eye, Respiratory, Systemic	WEAKNESS, NECK PAIN, BURNING EYES AND NOSE.	53-TUL-99. SEE 1999-1227. ACCORDING TO HIS WRITTEN COMPLAINT, THIS MAN SOUGHT MEDICAL ATTENTION THE NEXT DAY, BUT THE DOCTOR AND HOSPITAL ARE UNKNOWN.
1999	1493	Probable	Eye, Respiratory	BURNING NOSE, BURNING AND WATERING EYES.	53-TUL-99. SEE 1999-1227.
1999	1494	Probable	Eye, Respiratory, Systemic	BURNING AND IRRITATED EYES, THROAT IRRITATION, COUGHING, HEADACHE.	53-TUL-99. SEE 1999-1227. AFTER THE POLICE TOLD THIS WOMAN TO EVACUATE, SHE CALLED HER SON TO PICK HER UP. HER SON TOOK HER TO HIS HOUSE INSTEAD OF THE SCHOOL EVACUATION

					CENTER BECAUSE HE HEARD THE HAZMAT PERSONNEL WERE HOSING PEOPLE OFF.
1999	1495	Probable	Eye, Systemic	HEADACHE, STOMACH ACHE, EYE IRRITATION.	53-TUL-99. SEE 1999-1227.
1999	1496	Probable	Eye, Respiratory	BURNING EYES, SORE THROAT.	53-TUL-99. SEE 1999-1227.
1999	1497	Probable	Eye, Respiratory, Systemic	BURNING EYES AND THROAT, HEADACHE. EYE IRRITATION RESOLVED ONE DAY AFTER EXPOSURE, WHEN HEADACHE BEGAN.	53-TUL-99. SEE 1999-1227.
1999	1498	Probable	Skin, Eye, Respiratory	BURNING EYES, COUGHING, RASH ON THE ARMS.	53-TUL-99. SEE 1999-1227. THIS PERSON DEVELOPED THE RASH 2 AFTER EXPOSURE.
1999	1499	Probable	Respiratory, Systemic	HEADACHE, BURNING THROAT.	53-TUL-99. SEE 1999-1227. THIS RESIDENT REPORTED CONTINUED 'FEELING ILL' NINE DAYS AFTER EXOSURE.
1999	1500	Probable	Respiratory	COLD SYMPTOMS, RUNNY NOSE, CONGESTION, SNEEZING.	53-TUL-99. SEE 1999-1227. THIS PERSON SOUGHT MEDICAL ATTENTION THE DAY AFTER EXPOSURE, BUT THE INVESTIGATION DOES NOT IDENTIFY THE SOURCE OR PROVIDE ANY MEDICAL RECORDS.
1999	1501	Probable	Eye, Respiratory, Systemic	HEADACHE, SORE THROAT, SWOLLEN EYES. SYMPTOMS RESOLVED THE NEXT MORNING.	53-TUL-99. SEE 1999-1227.
1999	1502	Probable	Eye, Respiratory	BURNING AND WATERY EYES, BURNING NOSE.	53-TUL-99. SEE 1999-1227.
1999	1503	Probable	Eye, Respiratory	DIFFICULTY BREATHING, WATERY EYES.	53-TUL-99. SEE 1999-1227. THIS ASTHMATIC WOMAN SUFFERED DIFFICULTY BREATHING AND USED HER INHALER. SHE THEN SOUGHT MEDICAL ATTENTION.
1999	1505	Probable	Respiratory, Systemic	HEADACHE, ITCHY THROAT, BODY "FELT WEIRD".	53-TUL-99. SEE 1999-1227.
1999	1506	Probable	Eye, Respiratory, Systemic	BURNING AND WATERY EYES, BURNING THROAT, VOMITING, NAUSEA.	53-TUL-99. SEE 1999-1227. THIS RESIDENT'S AGE WAS NOT PROVIDED, BUT SHE WAS REPORTED TO BE A MINOR.
1999	1507	Probable	Systemic	HEADACHE, NAUSEA, VOMITING.	53-TUL-99. SEE 1999-1227. THIS RESIDENT REPORTED THAT POLICE ADVISED HIM TO GO INTO THE HOUSE, WHICH INDICATES THAT HE WAS EXPOSED OUTDOORS.
1999	1509	Probable	Systemic	HEADACHE.	53-TUL-99. SEE 1999-1227.
1999	1510	Possible	Systemic	DROWSINESS.	53-TUL-99. SEE 1999-1227. DROWSINESS IS AN UNEXPECTED SYMPTOM OF THIS EXPOSURE; IT MAY BE RELATED, BUT EVIDENCE CANNOT BE SAID TO SUPPORT IT.
1999	1511	Probable	Systemic	HEADACHE.	53-TUL-99. SEE 1999-1227.
1999	1512	Probable	Eye	BURNING AND WATERY EYES.	53-TUL-99. SEE 1999-1227. THIS BOY SMELLED AN ODOR AND DEVELOPED SYMPTOMS WHILE OUTSIDE HIS HOUSE. HE WENT IN

					THE HOUSE TO TRY TO AVOID THE STRONG ODOR. HIS AGE WAS NOT GIVEN, BUT HE WAS SAID TO BE A MINOR.
1999	1513	Probable	Eye	BURNING AND WATERY EYES.	53-TUL-99. SEE 1999-1227. STATEMENT DOES NOT DOCUMENT LOCATION APART FROM ADDRESS; THIS RESIDENT PRESUMED SISTER TO 1999-1512 AND INCLUDED IN THE PLURAL STATEMENT OF THAT CASE; SIMILARLY REPORTED TO BE A MINOR.
1999	1514	Probable	Eye	WATERY EYES.	53-TUL-99. SEE 1999-1227. THIS GIRL REPORTED A STRONG ODOR, SMELLING LIKE CHILI COOKING.
1999	1515	Possible	Systemic	HEADACHE.	53-TUL-99. SEE 1999-1227. THIS PERSON'S SPECIFIC LOCATION AT TIME OF EXPOSURE IS NOT KNOWN.
1999	1516	Probable	Eye, Respiratory, Systemic	HEADACHE, BURNING NOSE AND EYES.	53-TUL-99. SEE 1999-1227. THIS PERSON LEFT THE AREA AND STAYED IN DELANO UNTIL THE NEXT DAY.
1999	1517	Probable	Systemic	HEADACHE, DIZZINESS, SLEEPING DIFFICULTY.	53-TUL-99. SEE 1999-1227.
1999	1518	Probable	Eye, Respiratory	BURNING EYES AND THROAT.	53-TUL-99. SEE 1999-1227.
1999	1519	Probable	Systemic	DIZZINESS, NAUSEA.	53-TUL-99. SEE 1999-1227.
1999	1520	Probable	Systemic	HEADACHE.	53-TUL-99. SEE 1999-1227. THIS WOMAN REPORTED HER WINDOWS BEING OPEN WHEN SHE NOTICED A WEIRD SMELL. AT THE TIME OF HER COMPLAINT SIX DAYS AFTER EXPOSURE, SHE HAD A DOCTOR APPOINTMENT FOR THE NEXT MONDAY.
1999	1521	Probable	Eye, Respiratory	WATERY EYES, BURNING THROAT, FUSSINESS, CRYING A LOT.	53-TUL-99. SEE 1999-1227. THIS BOY'S MOTHER REPORTED HIS SYMPTOMS AND THAT THEY LASTED FOR TWO DAYS. CHILD'S AGE NOT STATED.
1999	1522	Probable	Eye, Systemic	IRRITATED AND TEARING EYES, NAUSEA, HEADACHE. HEADACHE CONTINUED INTERMITTENTLY THROUGH NOVEMBER 21, NINE DAYS AFTER EXPOSURE.	53-TUL-99. SEE 1999-1227.
1999	1523	Possible	Systemic	DIZZINESS, ANXIETY.	53-TUL-99. SEE 1999-1227. COMPLAINT OF NOVEMBER 19 SPECIFIES CONCERN ABOUT EXPOSURE, NOT FREE-FLOATING ANXIETY.
1999	1524	Probable	Eye	WATERY AND PAINFUL EYES.	53-TUL-99. SEE 1999-1227.
1999	1525	Probable	Eye	WATERY AND BURNING EYES.	53-TUL-99. SEE 1999-1227. THIS BOY COMPARED THE SENSATION SIMILAR TO CHILI BURNING HIS EYES.
1999	1526	Probable	Eye, Respiratory	BURNING EYES, NOSE AND THROAT.	53-TUL-99. SEE 1999-1227. THIS WOMAN'S EXPOSURE OCCURRED WHILE VISITING AT HER MOTHER'S HOUSE, WHICH IS NEAR THE APPLICATION SITE.
1999	1527	Probable	Eye, Systemic	HEADACHE, BURNING EYES.	53-TUL-99. SEE 1999-1227.
1999	1528	Probable	Eye, Systemic	STOMACH ACHE, HEADACHE, ITCHY EYES.	53-TUL-99. SEE 1999-1227.
1999	1529	Probable	Eye, Systemic	HEADACHE, ITCHY EYES,	53-TUL-99. SEE 1999-1227.

				STOMACH ACHE.	
1999	1530	Probable	Eye, Respiratory	BURNING THROAT, WATERY EYES.	53-TUL-99. SEE 1999-1227. THIS PERSON WALKED OUTSIDE HER HOUSE, BUT WAS FORCED TO GO BACK INSIDE BECAUSE THE SMELL CAUSED HER TO DEVELOP SYMPTOMS.
1999	1531	Probable	Eye, Respiratory	BURNING EYES, NOSE AND THROAT, NAUSEA.	53-TUL-99. SEE 1999-1227.
1999	1532	Probable	Respiratory, Systemic	NAUSEA, HEADACHE, SORE THROAT, IRRITATED NOSE.	53-TUL-99. SEE 1999-1227. THIS RESIDENT WAS EXAMINED BY A TEAM SENT FROM TULARE DISTRICT HOSPITAL TEN DAYS AFTER EXPOSURE. SHE CONTINUED TO SUFFER SYMPTOMS AT THAT TIME.
1999	1533	Probable	Eye, Respiratory, Systemic	BURNING EYES AND THROAT, HEADACHE, SEVERE NAUSEA, ANXIETY.	53-TUL-99. SEE 1999-1227. SYMPTOMS PERSISTED 11 DAYS AFTER EXPOSURE.
1999	1534	Probable	Eye, Systemic	WATERY EYES, HEADACHE, DIZZINESS.	53-TUL-99. SEE 1999-1227.
1999	1535	Probable	Eye	BURNING EYES. STILL FELT ILL NINE DAYS AFTER EXPOSURE.	53-TUL-99. SEE 1999-1227.
1999	1536	Probable	Eye, Respiratory	BURNING EYES AND THROAT.	53-TUL-99. SEE 1999-1227. AS THIS MAN SAT OUTSIDE, HE BEGAN SMELLING A CHEMICAL ODOR. WHEN THE SHERIFF CAME BY AND TOLD HIM TO STAY INDOORS, HE LEFT AND WENT TO DELANO.
1999	1537	Possible	Skin	RASH.	53-TUL-99. SEE 1999-1227. AT THE TIME OF THE INCIDENT, THE WINDOWS AT THIS GIRL'S HOUSE WERE OPEN. HER MOTHER REPORTED TAKING THE GIRL TO THE CLINIC AND BEING TOLD HER RASH WAS NOT RELATED TO EXPOSURE.
1999	1538	Possible	Systemic	STOMACH CRAMPS, DIARRHEA, NAUSEA.	53-TUL-99. SEE 1999-1227. THIS RESIDENT LIVED A LITTLE FARTHER FROM THE APPLICATION SITE THAN MOST OF THE AFFECTED PEOPLE, AND ALL MEMBERS OF THE HOUSEHOLD (1999-1602 THROUGH 1606) SUFFERED GASTROINTESTINAL SYMPTOMS BUT NO IRRITANT SYMPTOMS.
1999	1539	Probable	Respiratory	DIFFICULTY BREATHING.	53-TUL-99. SEE 1999-1227.
1999	1540	Probable	Eye, Systemic	VOMITING, BURNING EYES.	53-TUL-99. SEE 1999-1227.
1999	1541	Probable	Eye, Systemic	BURNING EYES, HEADACHE. THE HEADACHE CONTINUED FOR THREE TO FOUR DAYS.	53-TUL-99. SEE 1999-1227.
1999	1542	Probable	Eye, Systemic	HEADACHE, BURNING EYES. THE HEADACHE CONTINUED AT LEAST NINE DAYS AFTER EXPOSURE.	53-TUL-99. SEE 1999-1227. WHILE SITTING OUTSIDE HER HOUSE, THIS WOMAN SMELLED A ROTTEN EGG ODOR AND DEVELOPED SYMPTOMS.
1999	1543	Probable	Eye, Respiratory, Systemic	BURNING EYES AND THROAT, HEADACHE. THE HEADACHE CONTINUED AT LEAST NINE DAYS AFTER EXPOSURE.	53-TUL-99. SEE 1999-1227. WHILE SITTING OUTSIDE HER HOUSE, THIS PERSON SMELLED A ROTTEN EGG ODOR AND DEVELOPED SYMPTOMS.

1999	1544	Probable	Respiratory	RUNNY NOSE FOR THREE DAYS.	53-TUL-99. SEE 1999-1227. THIS BABY GIRL HAD A RUNNY NOSE FOR 3 DAYS ACCORDING TO HER MOTHER.
1999	1545	Probable	Eye, Respiratory	WATERY EYES, SCRATCHY THROAT.	53-TUL-99. SEE 1999-1227. UPON SMELLING THE ODOR, THIS FAMILY LEFT ON THEIR OWN INITIATIVE.
1999	1546	Possible	Systemic	VOMITING.	53-TUL-99. SEE 1999-1227. PROXY REPORT; AGE NOT STATED.
1999	1547	Probable	Eye	WATERY EYES.	53-TUL-99. SEE 1999-1227. PROXY REPORT, AGE NOT STATED; SYMPTOM OF TEARY EYES ENTERED ONCE AND PRESUMED TO DESCRIBE ENTIRE HOUSEHOLD.
1999	1548	Probable	Eye	WATERY EYES.	53-TUL-99. SEE 1999-1227. THIS FAMILY MEMBER FILED THE REPORT FOR THE HOUSEHOLD.
1999	1549	Probable	Eye	WATERY EYES.	53-TUL-99. SEE 1999-1227. PROXY REPORT; AGE NOT STATED.
1999	1550	Probable	Eye, Systemic	BURNING, IRRITATED AND TEARING EYES, DIZZINESS, HEADACHE, STOMACH PAIN, SORE THROAT.	53-TUL-99. SEE 1999-1227.
1999	1551	Probable	Eye	TEARY EYES.	53-TUL-99. SEE 1999-1227. PROXY REPORT, AGE NOT GIVEN.
1999	1552	Probable	Respiratory, Systemic	HEADACHE, THROAT IRRITATION.	53-TUL-99. SEE 1999-1227.
1999	1553	Probable	Eye	TEARY EYES.	53-TUL-99. SEE 1999-1227. PROXY REPORT, AGE NOT GIVEN.
1999	1554	Possible	Systemic	NAUSEA, VOMITING.	53-TUL-99. SEE 1999-1227. THIS RESIDENT LIVED IN THE SAME AREA AS MOST AFFECTED PEOPLE, BUT EXPERIENCED ONLY GASTROINTESTINAL SYMPTOMS, WHICH MAY DERIVE FROM THE EXPOSURE.
1999	1555	Probable	Eye	SWOLLEN EYES THROUGH THE DAY AFTER EXPOSURE.	53-TUL-99. SEE 1999-1227.
1999	1557	Probable	Eye, Systemic	BURNING EYES, STOMACH ACHE, HEADACHE.	53-TUL-99. SEE 1999-1227. THIS WOMAN'S HOME IS MISSING 3 WINDOWS.
1999	1558	Possible	Systemic	HEADACHE.	53-TUL-99. SEE 1999-1227.
1999	1559	Possible	Skin, Respiratory, Systemic	CHEST TIGHTNESS, HEADACHE, SLIGHTLY RED RASH ON THE FACE AND ARMS.	53-TUL-99. SEE 1999-1227. THIS WOMAN DID NOT SMELL AN ODOR. SHE CAME HOME FROM DELANO THE NIGHT OF 11/13/99 AND DEVELOPED SYMPTOMS WHICH RESOLVED IN 1 TO 2 DAYS.
1999	1560	Probable	Eye, Respiratory	BURNING AND WATERY EYES, BURNING NOSE.	53-TUL-99. SEE 1999-1227.
1999	1561	Probable	Eye	BURNING EYES.	53-TUL-99. SEE 1999-1227. AS THIS PERSON SAT OUTSIDE HER HOME, THE ODOR CAUSED HER EYES TO BURN AND FORCED HER TO GO INSIDE.
1999	1562	Probable	Eye, Respiratory	BURNING EYES AND THROAT.	53-TUL-99. SEE 1999-1227. AS THIS PERSON SAT OUTSIDE HER HOME, SHE DEVELOPED SYMPTOMS SO SHE WENT INSIDE.
1999	1563	Probable	Eye, Respiratory	IRRITATED EYES, BAD COUGH.	53-TUL-99. SEE 1999-1227.
1999	1564	Probable	Eye,	BAD COUGH, WATERY AND	53-TUL-99. SEE 1999-1227. THIS BOY HAD A COUGH FOR 2 WEEKS

			Respiratory	IRRITATED EYES.	ACCORDING TO HIS FATHER.
1999	1565	Probable	Eye, Systemic	BURNING AND WATERY EYES, STOMACH ACHE.	53-TUL-99. SEE 1999-1227. AGE NOT GIVEN; SAID TO BE A MINOR. SHE REPORTED THAT SHE SMELLED THE ODOR AND DEVELOPED SYMPTOMS UPON OPENING THE DOOR TO THE OFFICERS WHO ALERTED THE FAMILY TO THE EVACUATION.
1999	1566	Probable	Eye, Systemic	HEADACHE, EYE IRRITATION, NAUSEA. SYMPTOMS SUBSIDED THE DAY AFTER EXPOSURE.	53-TUL-99. SEE 1999-1227. THIS WOMAN WAS WALKING BY THE EAST OF THE ELEMENTARY SCHOOL AT THE TIME OF THE INCIDENT.
1999	1567	Probable	Eye, Respiratory	BURNING EYES, SORE THROAT.	53-TUL-99. SEE 1999-1227.
1999	1568	Probable	Eye, Respiratory	BURNING AND WATERY EYES, BURNING NOSE AND THROAT.	53-TUL-99. SEE 1999-1227.
1999	1569	Probable	Eye, Systemic	EYE IRRITATION, DIZZINESS.	53-TUL-99. SEE 1999-1227. AS PART OF HER WORK FOR A TULARE COUNTY PROGRAM, THIS DELANO RESIDENT VISITED 11 FAMILIES IN EARLIMART ON 11/12/99. SHE SMELLED AN ODOR LIKE SOMETHING BURNING AND DEVELOPED SYMPTOMS THAT RESOLVED THE NEXT DAY.
1999	1570	Probable	Eye	BURNING EYES.	53-TUL-99. SEE 1999-1227.
1999	1571	Probable	Eye, Systemic	BURNING EYES, STOMACH ACHE, NAUSEA, VOMITING.	53-TUL-99. SEE 1999-1227.
1999	1572	Probable	Skin, Eye, Systemic	EYE IRRITATION, NAUSEA, VOMITING, RASH ON THE FACE.	53-TUL-99. SEE 1999-1227. HER FATHER REPORTED SMELLING A HEAVY GARLIC TYPE ODOR REMINDING HIM OF FILIPINO COOKING. M. O'MALLEY, M.D., MADE NOTE OF THE CHILD'S FACIAL RASH AND RECORDED QUESTION OF ITS RELATION TO EXPOSURE.
1999	1573	Possible	Eye	SLIGHT EYE IRRITATION.	53-TUL-99. SEE 1999-1227. THIS MAN SUFFERS FROM BILATERAL PTERYGIA WHICH HE STATED IS A LONG TERM PROBLEM. ALL AVAILABLE INFORMATION PROVIDED IN AN INTERVIEW WITH DR. MICHAEL O'MALLEY.
1999	1574	Probable	Eye, Systemic	BURNING EYES, STOMACH ACHE, NAUSEA, VOMITING.	53-TUL-99. SEE 1999-1227. HIS FATHER RECORDED SMELLING THE ODOR (1999-1570).
1999	1575	Possible	Skin	SKIN IRRITATION.	53-TUL-99. SEE 1999-1227. THIS MAN AWOKE VERY EARLY IN THE MORNING WITH SYMPTOMS. ALL AVAILABLE INFORMATION PROVIDED BY INTERVIEW WITH DR. MICHAEL O'MALLEY.
1999	1576	Probable	Eye, Systemic	HEADACHE, TEARY EYES, DIZZINESS, STOMACH ACHE, CHILLS.	53-TUL-99. SEE 1999-1227. SYMPTOMS WERE STILL PRESENT SIX DAYS AFTER EXPOSURE. THIS FARM LABORER INDICATED THAT A LANGUAGE BARRIER PREVENTED APPROPRIATE ATTENTION FROM AMBULANCE, FIRE, AND SHERIFF'S PERSONNEL.
1999	1577	Probable	Eye, Systemic	BURNING AND WATERING EYES, HEADACHE, DIZZINESS.	53-TUL-99. SEE 1999-1227. THIS MAN'S EXPOSURE OCCURRED WHILE ATTENDING A BARBECUE.
1999	1578	Possible	Systemic	NAUSEA (FELT LIKE SHE WAS GOING TO VOMIT).	53-TUL-99. SEE 1999-1227.

1999	1579	Probable	Eye	PAIN IN EYES.	53-TUL-99. SEE 1999-1227. THIS RESIDENT STATED THAT EIGHT MEMBERS OF HIS FAMILY FELT SICK, WITH SYMPTOMS INCLUDING HEADACHES AND VOMITING AS WELL AS EYE PAIN. THE AFFECTED PEOPLE WERE NOT IDENTIFIED INDIVIDUALLY.
1999	1580	Probable	Eye, Respiratory, Systemic	ITCHY EYES, SORE THROAT, HEADACHE, CHEST PAIN.	53-TUL-99. SEE 1999-1227, 1579. THE FAMILY LEFT OF THEIR OWN INITIATIVE, NOT NOTIFIED OF EVACUATION.
1999	1581	Probable	Eye, Respiratory	TEARY EYES, IRRITATED THROAT.	53-TUL-99. SEE 1999-1227. THIS PERSON IS ONE OF 6 FAMILY MEMBERS (SEE 1999-1582 TO 1586) WHO SAW A DOCTOR AT THE CHURCH AND AGAIN 10 DAYS AFTER THE INCIDENT.
1999	1582	Probable	Eye, Respiratory	TEARY EYES, IRRITATED THROAT.	53-TUL-99. SEE 1999-1227, 1581.
1999	1583	Probable	Eye, Respiratory	TEARY EYES, IRRITATED THROAT.	53-TUL-99. SEE 1999-1227, 1581.
1999	1584	Probable	Eye, Respiratory	TEARY EYES, IRRITATED THROAT.	53-TUL-99. SEE 1999-1227, 1581.
1999	1585	Probable	Eye, Respiratory	TEARY EYES, IRRITATED THROAT.	53-TUL-99. SEE 1999-1227, 1581.
1999	1586	Probable	Eye, Respiratory	TEARY EYES, IRRITATED THROAT.	53-TUL-99. SEE 1999-1227, 1581.
1999	1587	Probable	Skin, Eye, Respiratory	IRRITATED EYES, SEVERE RASH, BAD COUGH, ANXIETY.	53-TUL-99. SEE 1999-1227.
1999	1588	Probable	Eye, Respiratory, Systemic	NAUSEA, LIGHTHEADEDNESS, DIZZINESS, BURNING AND IRRITATED EYES, UPPER RESPIRATORY IRRITATION.	53-TUL-99. SEE 1999-1227. THIS WOMAN DEVELOPED SYMPTOMS WHILE WORKING AT THE DRIVE-UP WINDOW AT AN EARLIMART RESTAURANT. SHE SUBSEQUENTLY RECEIVED A PRESCRIPTION FOR ANTIBIOTICS TO TREAT A SINUS INFECTION.
1999	1589	Probable	Eye, Respiratory, Systemic	SHORTNESS OF BREATH, CHEST TIGHTNESS, CHOKING, DRY AND IRRITATED THROAT, BURNING EYES, STOMACHE ACHE.	53-TUL-99. SEE 1999-1227. THIS FARM LABORER WOKE VERY EARLY SATURDAY MORNING NOVEMBER 13 WITH CHEST TIGHTNESS AND A SENSATION OF DROWNING. HIS SYMPTOMS HAD SUBSIDED SUBSTANTIALLY WITHIN SIX DAYS AFTER EXPOSURE.
1999	1590	Probable	Eye, Systemic	BURNING EYES, STOMACH ACHE.	53-TUL-99. SEE 1999-1227. SIX DAYS AFTER EXPOSURE, THIS RESIDENT STATED THAT HER HUSBAND CONTINUED TO FEEL EFFECTS. SHE DID NOT PROVIDE HIS NAME OR LIST HIS SYMPTOMS.
1999	1591	Probable	Eye, Respiratory	BURNING AND IRRITATED EYES, SNEEZING.	53-TUL-99. SEE 1999-1227. THIS WOMAN WALKED OUT TO THE STREET ABOUT 8:00 PM, SMELLED A SULFUR-LIKE ODOR AND DEVELOPED SYMPTOMS.
1999	1592	Possible	Eye, Systemic	DIZZINESS, BLURRY VISION.	53-TUL-99. SEE 1999-1227.
1999	1593	Possible	Skin, Systemic	FEELING SICK, ITCHING.	53-TUL-99. SEE 1999-1227. THIS BOY AND HIS SISTER (1999-1594) WERE PLAYING AT A NEIGHBOR'S HOUSE WHEN THEY SMELLED A BAD ODOR.

1999	1594	Possible	Skin, Systemic	FEELING SICK, ITCHING.	53-TUL-99. SEE 1999-1227, 1593.
1999	1595	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	53-TUL-99. SEE 1999-1227. A FAMILY OF 6 (1999-1595 TO 1600) WAS HOLDING A BARBECUE WHEN THEY BEGAN DEVELOPING SYMPTOMS. THREE OTHER ADULTS WERE ALSO PRESENT.
1999	1596	Probable	Eye, Systemic	BURNING EYES, STOMACH ACHE, NAUSEA, VOMITING, DIZZY SPELLS.	53-TUL-99. SEE 1999-1227, 1595. SHE NOTED THAT THE YOUNGEST CHILDREN WERE THE FIRST TO FEEL EFFECTS.
1999	1597	Probable	Eye	BURNING EYES.	53-TUL-99. SEE 1999-1227. 1595.
1999	1598	Probable	Eye, Systemic	BURNING EYES, STOMACH ACHE, NAUSEA, VOMITING.	53-TUL-99. SEE 1999-1227, 1595.
1999	1599	Probable	Eye, Systemic	BURNING EYES, STOMACH ACHE, NAUSEA, VOMITING.	53-TUL-99. SEE 1999-1227, 1595.
1999	1600	Probable	Eye, Systemic	BURNING EYES, STOMACH ACHE, NAUSEA, VOMITING.	53-TUL-99. SEE 1999-1227, 1595.
1999	1601	Probable	Eye, Systemic	BURNING AND TEARY EYES, DIZZINESS.	53-TUL-99. SEE 1999-1227. AT THE TIME OF THE INCIDENT, THIS WOMAN HAD VALLEY FEVER AND WAS TAKING MEDICATION, WHICH SHE SAID IS NOT HELPING.
1999	1602	Possible	Systemic	STOMACH CRAMPS, DIARRHEA, NAUSEA.	53-TUL-99. SEE 1999-1227, 1538. THE SAME GASTROINTESTINAL MANIFESTATIONS WERE REPORTED FOR ALL SIX MEMBERS OF THIS HOUSEHOLD (1999-1538 AND 1602 THROUGH 1606).
1999	1603	Possible	Systemic	STOMACH CRAMPS, DIARRHEA, NAUSEA.	53-TUL-99. SEE 1999-1227, 1538, 1602.
1999	1604	Possible	Systemic	STOMACH CRAMPS, DIARRHEA, NAUSEA.	53-TUL-99. SEE 1999-1227, 1538, 1602.
1999	1605	Possible	Systemic	STOMACH CRAMPS, DIARRHEA, NAUSEA, VOMITING FOR 3 DAYS.	53-TUL-99. SEE 1999-1227, 1538, 1602.
1999	1606	Possible	Systemic	STOMACH CRAMPS, DIARRHEA, NAUSEA.	53-TUL-99. SEE 1999-1227, 1538, 1602.
1999	1607	Probable	Eye, Respiratory	WATERY EYES, BURNING NOSE AND THROAT.	53-TUL-99. SEE 1999-1227. THIS MOTHER OF SIX REPORTED THAT HER CHILDREN ALSO EXPERIENCED SYMPTOMS, BUT DID NOT PROVIDE DETAILS.
1999	1608	Probable	Eye	PAINFUL AND WATERY EYES.	53-TUL-99. SEE 1999-1227. WHEN THIS BOY SMELLED THE ODOR AND DEVELOPED SYMPTOMS, HE WENT INSIDE HIS HOUSE TO ESCAPE IT.
1999	1609	Probable	Eye, Respiratory, Systemic	TEARY EYES, DIZZINESS, RESPIRATORY PROBLEMS, STOMACH ACHE, VOMITING.	53-TUL-99. SEE 1999-1227.
1999	1610	Probable	Eye, Systemic	TEARY EYES, HEADACHE.	53-TUL-99. SEE 1999-1227.
1999	1611	Possible	Systemic	STOMACH ACHE, NAUSEA, HEADACHE.	53-TUL-99. SEE 1999-1227.
1999	1612	Probable	Respiratory, Systemic	DIZZINESS, HEADACHE, DIFFICULTY BREATHING.	53-TUL-99. SEE 1999-1227.

1999	1613	Possible	Systemic	NAUSEA, HEADACHE, UPSET STOMACH.	53-TUL-99. SEE 1999-1227.
1999	1614	Probable	Eye, Systemic	NAUSEA, EYE IRRITATION.	53-TUL-99. SEE 1999-1227.
1999	1615	Probable	Eye, Systemic	LEFT-SIDED HEADACHE, BURNING EYES, DIZZINESS.	53-TUL-99. SEE 1999-1227. AT THE TIME OF THE INCIDENT, THIS WOMAN WAS ATTENDING A BARBECUE.
1999	1616	Probable	Respiratory, Systemic	DIZZINESS, SCRATCHY THROAT, SEVERE MIGRAINE.	53-TUL-99. SEE 1999-1227. THIS RESIDENT REPORTED SHE WAS NOT INFORMED ABOUT THE INCIDENT OR EVACUATION, BUT LEARNED WHAT HAPPENED BY CALLING AN AMBULANCE COMPANY. HER REPORT SUGGESTS THAT OTHER PEOPLE WERE AT THAT LOCATION.
1999	1617	Probable	Skin, Systemic	ITCHING, FACIAL RASH, VOMITING.	53-TUL-99. SEE 1999-1227. THIS WOMAN DEVELOPED SYMPTOMS WHILE IN HER BACKYARD.
1999	1618	Possible	Skin, Systemic	DIZZINESS, TIREDNESS, HEADACHE, NAUSEA.	53-TUL-99. SEE 1999-1227.
1999	1619	Possible	Skin, Systemic	RASH ON THE BODY, SORE LEGS.	53-TUL-99. SEE 1999-1227.
1999	1620	Probable	Eye, Respiratory, Systemic	BURNING EYES, HEADACHE, SORE THROAT.	53-TUL-99. SEE 1999-1227. THIS PERSON DEVELOPED SYMPTOMS WHEN HE WALKED OUTSIDE HIS HOUSE AROUND 5:00 PM. SYMPTOMS PERSISTED AT LEAST SIX DAYS AFTER EXPOSURE.
1999	1621	Probable	Eye, Respiratory, Systemic	BURNING EYES, HEADACHE, SORE THROAT. HEADACHE AND SORE THROAT PERSISTED AT LEAST SIX DAYS.	53-TUL-99. SEE 1999-1227.
1999	1622	Probable	Eye, Respiratory	BURNING EYES, ITCHY THROAT.	53-TUL-99. SEE 1999-1227.
1999	1623	Probable	Respiratory, Systemic	HEADACHE, DIZZINESS, PAINFUL AND ITCHY THROAT, CHEST PAIN. SYMPTOMS SUBSIDED THE DAY AFTER EXPOSURE.	53-TUL-99. SEE 1999-1227. THIS RESIDENT COMMENTED THAT DRIFT IS AN ONGOING PROBLEM WHEN THE WIND BLOWS FROM THE EAST.
1999	1624	Probable	Respiratory, Systemic	HEADACHE, DIZZINESS, SORE THROAT.	53-TUL-99. SEE 1999-1227.
1999	1625	Probable	Respiratory, Systemic	SNEEZING, HEADACHE, VOMITING, SORE THROAT.	53-TUL-99. SEE 1999-1227.
1999	1626	Probable	Eye, Respiratory	BURNING EYES, THROAT AND LUNGS. SYMPTOMS PERSISTED ABOUT A WEEK.	53-TUL-99. SEE 1999-1227. THIS RESIDENT REPORTED PASSING THE APPLICATION SITE DURING THE EARLY PART OF THE SET AND NOTING ABSENCE OF ODOR, THEN SMELLING INTENSE ODOR WHEN HE PASSED AGAIN ABOUT TEN MINUTES LATER.
2000	109	Definite	Skin	RED AND BURNING SKIN ON THE TOP OF THE RIGHT FOOT.	WHEN A TRUCK DRIVER PICKED UP A TRANSFER HOSE TO TRANSFER FERTILIZER INTO HIS TRUCK TANK, A SMALL AMOUNT OF LIQUID DRIPPED ON TO HIS LEATHER BOOT. THE HOSE APPARENTLY HAD PREVIOUSLY BEEN USED FOR METAM-SODIUM. HIS FOOT BEGAN BURNING THAT NIGHT.
2000	316	Possible	Skin	RED, ITCHY RASH ON THE HANDS,	A POLE TECHNICIAN STATED HE ROUTINELY GOT METAM-

				FOREARMS AND LOWER LEGS.	SODIUM ON HIS CLOTHES, WORK BOOTS & FIELD EQUIPMENT WHILE POURING THE PRODUCT INTO DRILLED HOLES IN UTILITY POLES. HE STATED HE WORE ALL REQUIRED PPE. HIS SUPERVISOR REPORTED SEEING HIM NOT WEARING HIS PPE.
2000	441	Probable	Eye, Respiratory, Systemic	BURNING EYES, RUNNY NOSE, DIFFICULTY BREATHING, SORE THROAT, COUGHING, CHEST PAINS, HEADACHE.	276 YARDS. SIX PEOPLE, INCLUDING A FAMILY OF 4, DEVELOPED SYMPTOMS UPON SMELLING AN ODOR FROM A NEARBY FIELD TREATED WITH METAM-SODIUM IN PREPARATION FOR PLANTING ENDIVE. MOST OF THEIR SYMPTOMS IMPROVED WHEN THEY LEFT THE AREA. SEE 2000-442, 839 TO 842.
2000	442	Probable	Eye, Respiratory, Systemic	BURNING EYES, DIFFICULTY BREATHING, NASAL IRRITATION, SORE THROAT, BILATERAL LEG WEAKNESS, JITTERY, HEADACHE, DIZZINESS, DIARRHEA, COUGHING UP MUCOUS, METALLIC TASTE IN THE MOUTH.	SEE 2000-441. THE GROWER WAS CITED FOR CREATING A HEALTH HAZARD AND FAILING TO MITIGATE IT WHEN NOTIFIED OF THE PROBLEM. THIS WOMAN WAS 7 MONTHS PREGNANT AT THE TIME OF THE INCIDENT.
2000	839	Probable	Eye, Respiratory	BURNING EYES, SHORTNESS OF BREATH, NASAL CONGESTION.	SEE 2000-441. THIS BOY ALSO HAD OTITIS MEDIA AND THE DOCTOR PRESCRIBED ANTIBIOTICS.
2000	840	Probable	Eye, Respiratory	NASAL CONGESTION, BURNING EYES, BREATHING DIFFICULTY.	SEE 2000-441.
2000	841	Possible	Systemic	METALLIC TASTE IN THE MOUTH, STOMACH PAINS.	SEE 2000-441. THIS WOMAN DID NOT SEEK MEDICAL ATTENTION FOR THE METALLIC TASTE IN HER MOUTH, BUT SOUGHT ATTENTION FOR STOMACH PAINS THAT DEVELOPED 3 DAYS LATER. HER EMPLOYER SENT ALL OTHER EMPLOYEES HOME UPON ARRIVING AT WORK, BUT MISSED HER.
2000	842	Probable	Eye, Respiratory	TEARING EYES, DIFFICULTY BREATHING.	SEE 2000-441. THIS MAN WORKS FOR THE COMPANY WHOSE PROPERTY WAS TREATED. HE LIVES IN A MOTOR HOME CLOSE TO THE TREATED FIELD. HE SPENT A NIGHT IN A MOTEL WHERE HIS SYMPTOMS ABATED. HE DID NOT SEEK MEDICAL ATTENTION.
2000	893	Probable	Eye	ITCHY, RED, BURNING AND TEARING EYES, MORE SEVERE IN THE RIGHT EYE.	AN APPLICATOR DEVELOPED RED EYES AFTER A DAY OF APPLYING METAM-SODIUM TO SOIL, THEN TARPING OVER IT. HE WORE A FULL-FACE RESPIRATOR FOR THE APPLICATION, BUT WORE GOGGLES WHILE MENDING THE TARP. SWEAT MAY HAVE RUN INTO HIS EYES, AS THE DAY WAS HOT.
2000	971	Definite	Skin, Systemic	DIZZINESS, NAUSEA, VOMITING, BURNING AND PEELING SKIN ON THE FEET.	WHEN AN APPLICATOR UNHOOKED A HOSE FROM A METAM-SODIUM TANK, SOME LIQUID SPILLED ON HIS FEET. HE ALSO SMELLED THE ODOR. HIS SUPERVISOR OFFERED FOR HIM TO WASH OFF AT THE SHOP, BUT HE WENT HOME INSTEAD. HE DEVELOPED SYMPTOMS & SAW A DOCTOR THE NEXT DAY.
2001	10	Probable	Systemic	HEADACHE, NAUSEA, VOMITING, DIZZINESS.	WHILE APPLYING METAM-SODIUM TO THE BEDDED UP FIELD, A WORKER NOTICED A CLOGGED NOZZLE. HE REMOVED HIS FULL-FACE RESPIRATOR BEFORE HE UNCLOGGED THE NOZZLE. HE

					INHALED SOME OF THE PESTICIDE FUMES AND DEVELOPED SYMPTOMS.
2001	89	Probable	Eye, Respiratory, Systemic	NAUSEA, VOMITING, THROBBING HEADACHE, MINOR SHORTNESS OF BREATH, RED AND IRRITATED EYES.	AN APPLICATOR SMELLED A FAINT STINKY ODOR THROUGH HIS RESPIRATOR WHILE APPLYING METAM-SODIUM TO PRE-PLANT GRAPE HOLES. HE DEVELOPED SYMPTOMS ABOUT 30 MINUTES LATER. THE PRODUCT REQUIRES MORE PROTECTIVE EQUIPMENT THAN HE USED.
2001	256	Probable	Systemic	HEADACHE, DIZZINESS, NAUSEA, VOMITING, BRIEF LOSS OF CONSCIOUSNESS.	A WORKER TREATS ELECTRIC POLES WITH CHEMICALS TO PREVENT DECAY. HE DEVELOPED SYMPTOMS WHEN HE OPENED A NEW CONTAINER OF METAM-SODIUM AND INHALED THE FUMES. HE BRIEFLY LOST CONSCIOUSNESS. HIS FOREMAN FOUND HIM AND TOOK HIM TO A HOSPITAL.
2001	365	Possible	Skin	RASH ON THE LOWER BACK.	AN IRRIGATOR APPLIED METAM-SODIUM THROUGH A SPRINKLER IRRIGATION SYSTEM. DURING THE SUBSEQUENT WATER RUN, HE ENTERED THE FIELD TO UNCLOG SPRINKLER NOZZLES. WHILE DOING SO, AN ADJOINING SPRINKLER SPRAYED WATER ONTO HIS BACK. HE LATER DEVELOPED A RASH.
2001	848	Probable	Systemic	NAUSEA, HEADACHE.	133 YARDS. AN IRRIGATOR WORKED FOR SEVERAL HOURS IN A FIELD ADJACENT TO AN EQUIPMENT YARD WHERE A VANDALIZED TRACTOR LEAKED METAM-SODIUM ONTO THE GROUND. THE ODOR MADE HIM FEEL SICK. HE RECOVERED QUICKLY IN FRESH AIR AND LEFT FOR HIS ANNUAL FURLOUGH.
2002	50	Probable	Eye, Systemic	BLURRY VISION, NAUSEA.	TWO APPLICATOR/IRRIGATORS DEVELOPED SYMPTOMS AFTER THEY TURNED ON THE SPRINKLERS FOR SEALING A METAM-SODIUM APPLICATION AND TURNED OFF THE SPRINKLERS AFTER THE WATER RUN. THEY SOUGHT MEDICAL ATTENTION THE NEXT DAY. SEE 2002-51.
2002	51	Probable	Systemic	NAUSEA.	SEE 2002-50.
2002	73	Probable	Respiratory, Systemic	NAUSEA, FATIGUE, SHORTNESS OF BREATH, CHEST PAINS, DIFFICULTY BREATHING.	DURING A METAM-SODIUM SOIL FUMIGATION, A HOSE RUPTURED RESULTING IN A STRONG ODOR ENTERING THE TRACTOR'S ENCLOSED CAB THROUGH SOME SMALL ENTRY HOLES BEHIND THE DRIVER SEAT. THE APPLICATOR DEVELOPED SYMPTOMS, BUT WAITED 3 DAYS BEFORE SEEING A DOCTOR.
2002	425	Probable	Eye, Respiratory, Systemic	BURNING & TEARING EYES, IRRITATED NASAL PASSAGES, DIFFICULTY BREATHING, NAUSEA, VOMITING, LEG WEAKNESS, TIREDNESS. TWO WEEKS AFTER REPORTING FEELING FINE, SHE SAW ANOTHER DOCTOR AND REPORTED SIGNIFICANT	35-KER-02. FIVE CREWS TOTALING 137 WORKERS EXPERIENCED SYMPTOMS WHEN THE ODOR FROM A NEARBY METAM-SODIUM SPRINKLER APPLICATION MOVED INTO THE VINEYARD THEY STARTED WORKING IN. ONLY THIS WORKER SOUGHT MEDICAL ATTENTION. SEE 2002-631TO 764, 1147 TO 1149.

				ADDITIONAL SYMPTOMS BEING PRESENT SINCE EXPOSURE.	
2002	631	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS MAN WORKS AS THE CREW 1 FOREMAN. HE REPORTED HIS WHOLE GRAPE GIRDLING CREW NOTICED THE ODOR AND SUFFERED BURNING EYES. HE SAID HIS SYMPTOMS RESOLVED ONCE HE MOVED AWAY FROM THE SITE. HE ALSO WASHED HIS EYES WITH WATER.
2002	632	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN. CREWS 1 AND 2 STARTED 200 FEET FROM THE APPLICATION SITE. THEY MOVED 1/2 MILE AWAY TO THE LOCATION OF CREWS 3, 4 AND 5.
2002	633	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN. WHEN THE HEAD FOREMAN DETERMINED WORKERS IN ALL 5 CREWS REPORTING BURNING EYES, HE MOVED THEM 1 MILE AWAY FROM THE APPLICATION SITE.
2002	634	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN. THE FOREMEN AND INTERVIEWED WORKERS REPORTED RAPID DISSIPATION OF SYMPTOMS ONCE THEY MOVED 1 MILE FROM THE APPLICATION SITE.
2002	635	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN.
2002	636	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN.
2002	637	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN.
2002	638	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN.
2002	639	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN.
2002	640	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN.
2002	641	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN.
2002	642	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN.
2002	643	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN.
2002	644	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN.
2002	645	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1. HE

					SAID HE NOTICED AN ODOR AS SOON AS HE DROVE INTO THE FIELD. HE EXPERIENCED SYMPTOMS IMMEDIATELY WHICH RESOLVED SOON AFTER THE HEAD CREW FOREMAN MOVED THE CREWS OUT OF THE AREA.
2002	646	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN.
2002	647	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1. THE FOREMAN HAD ALREADY TOLD THE CREW TO MOVE WHEN HE ARRIVED. HIS EYES ONLY BURNED FOR 1 TO 2 MINUTES. HIS WIFE DROVE THEIR VEHICLE AND QUICKLY MOVED TO THE NEW SITE.
2002	648	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN.
2002	649	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN.
2002	650	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1 AND SUFFERED BURNING EYES ACCORDING TO HIS FOREMAN.
2002	651	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 1. DURING AN INTERVIEW, HE STATED HE SUFFERED BURNING AND TEARING EYES. HIS SYMPTOMS RESOLVED ONCE HIS CREW RELOCATED.
2002	652	Probable	Eye	TEARING EYES.	35-KER-02. SEE 2002-425. THIS MAN WORKS AS THE CREW 2 FOREMAN. HE HAD NOT STARTED WORK YET, NOR LEFT HIS VEHICLE WHEN HIS EYES BEGAN TEARING. HE SAID HIS SYMPTOMS RESOLVED WHEN THEY MOVED TO THE RESERVOIR, 1 MILE AWAY FROM THE APPLICATION SITE.
2002	660	Probable	Eye, Respiratory	TEARING EYES, IRRITATED NOSE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 2. UPON INTERVIEW, HE REPORTED NOTICING AN ODOR ABOUT FIVE MINUTES AFTER HIS ARRIVAL. HE DEVELOPED SYMPTOMS WHICH RESOLVED ABOUT 20 MINUTES LATER WHEN THEY MOVED FARTHER AWAY FROM THE TREATED FIELD.
2002	665	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 2. HE NOTICED AN ODOR SOON AFTER ARRIVING AT THE VINEYARD. HE AND FIVE OTHER WORKERS IN THE VAN IMMEDIATELY EXPERIENCED BURNING AND TEARING EYES. HIS SYMPTOMS RESOLVED WHEN THEY RELOCATED.
2002	670	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS MAN WORKS AS THE HEAD CREW FOREMAN FOR THE 5 CREWS. HE NOTICED AN ODOR WHEN HE APPROACHED THE VINEYARD AND EXPERIENCED SYMPTOMS. HE MOVED THE CREWS ABOUT 1/2 MILE AWAY, THEN 1 MILE AWAY FROM THE APPLICATION SITE.
2002	671	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS MAN WORKS AS THE CREW FOREMAN. HE REPORTED HIS WHOLE LEAF PULLING CREW

					NOTICED THE ODOR AND SUFFERED BURNING EYES. HE SAID HIS SYMPTOMS RESOLVED ONCE HE MOVED AWAY FROM THE SITE. HE ALSO WASHED HIS EYES WITH WATER.
2002	672	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS MAN WORKS AS THE ASSISTANT CREW FOREMAN. HE REPORTED THE CREW COMPLAINED ABOUT THEIR EYES. HE SAID HIS SYMPTOMS RESOLVED ONCE HE MOVED AWAY FROM THE SITE.
2002	673	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HER FOREMAN.
2002	674	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3. HE NOTICED AN ODOR THAT HE THOUGHT ORIGINATED FROM THE IRRIGATION SPRINKLERS. HE SUFFERED BURNING AND TEARING EYES. HIS SYMPTOMS WENT AWAY AFTER THE CREW MOVED AWAY FROM THE APPLICATION SITE.
2002	675	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	676	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	677	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HER FOREMAN.
2002	678	Probable	Eye, Systemic	BURNING AND TEARING EYES, NAUSEA.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3. HE NOTICED A BAD ODOR ON THE WAY TO THE VINEYARD. HE DEVELOPED SYMPTOMS, WHICH RESOLVED WHEN THE FOREMAN MOVED THE CREW AWAY FROM THE APPLICATION SITE.
2002	679	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	680	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HER FOREMAN.
2002	681	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	682	Probable	Eye	TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED TEARING EYES. SHE NOTICED AN ODOR AROUND THE SAME LOCATION THAT OTHER WORKERS HAD MENTIONED. SHE NOTICED MANY OTHER WORKERS WITH TEARING EYES.
2002	683	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND

					SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	684	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	685	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HER FOREMAN.
2002	686	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HER FOREMAN.
2002	687	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HER FOREMAN.
2002	688	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HER FOREMAN.
2002	689	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	690	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	691	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	692	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HER FOREMAN.
2002	693	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HER FOREMAN.
2002	694	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3. HE NOTICED AN ODOR WHEN HE GOT OUT OF HIS CAR AND HIS EYES BEGAN TO BURN AND TEAR. HE ALSO WITNESSED ONE WORKER VOMIT. HIS SYMPTOMS IMPROVED WHEN THE FOREMAN MOVED HIS CREW.
2002	695	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HER FOREMAN.
2002	696	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HER

					FOREMAN.
2002	697	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	698	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	699	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	700	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	701	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	702	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	703	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	704	Probable	Eye	BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 3 AND SUFFERED BURNING AND TEARING EYES ACCORDING TO HIS FOREMAN.
2002	705	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WOMAN WORKS AS THE CREW 5 FOREMAN. THE CREW WAS ASSIGNED TO PULL LEAVES. SHE NOTICED AN ODOR AS SHE DROVE UP TO THE FIELD. SHE STATED THAT SHE KNEW OF NO CREW MEMBERS THAT DID NOT HAVE SYMPTOMS.
2002	706	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	707	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	708	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	709	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.

2002	710	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	711	Probable	Eye, Respiratory	BURNING AND TEARING EYES, "FELT LIKE SOMETHING IN THE THROAT".	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. HE DID NOT RECALL AN ODOR UNTIL HE ENTERED THE FIELD. HE DEVELOPED SYMPTOMS AND NOTED SOME WORKERS WERE FEELING NAUSEATED. HIS SYMPTOMS RESOLVED WHEN THE CREW RELOCATED.
2002	712	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	713	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	714	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	715	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	716	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	717	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	718	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	719	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	720	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	721	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	722	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	723	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5.

					ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	724	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	725	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	726	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	727	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	728	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	729	Probable	Eye, Respiratory	SCRATCHY THROAT, BURNING AND TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. HE NOTICED A ROTTEN SMELL WHEN HE ARRIVED FOR WORK THAT DAY. HE DEVELOPED SYMPTOMS AFTER WORKING ABOUT 20 VINES INTO THE ROW.
2002	730	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	731	Probable	Eye, Respiratory	BURNING AND TEARING EYES, SCRATCHY THROAT.	35-KER-02. SEE 2002-425. THIS WOMAN WORKS AS THE CREW 4 FOREMAN. SHE REPORTED HER WHOLE LEAF PULLING CREW SUFFERED BURNING EYES. SHE NOTICED AN ODOR WHEN THE CREW STARTED WORKING. SHE THEN DEVELOPED SYMPTOMS, WHICH LASTED 15 MINUTES.
2002	732	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES, EXCEPT FOR ONE WORKER WHO SUFFERED MORE THAN ANYONE ELSE AND ASKED TO BE TAKEN TO A DOCTOR.
2002	733	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	734	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	735	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.

2002	736	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	737	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	738	Probable	Eye, Respiratory	SCRATCHY THROAT, TEARING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. HE NOTICED AN ODOR WHEN HE ENTERED THE VINEYARD. HIS CREW WAS RELOCATED AND HE WASHED HIS EYES. HIS SYMPTOMS RESOLVED SHORTLY THEREAFTER.
2002	739	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	740	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	741	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	742	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	743	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	744	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	745	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	746	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	747	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	748	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	749	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING

					EYES.
2002	750	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	751	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	752	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	753	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	754	Probable	Eye, Respiratory	BURNING AND TEARING EYES, DRY AND SCRATCHY THROAT.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. SHE NOTICED A STRONG ODOR UPON ARRIVAL AND EXPERIENCED SYMPTOMS UPON BEGINNING WORK. MOST OF HER SYMPTOMS RESOLVED WHEN RELOCATED, BUT HER THROAT STILL FELT DRY THE NEXT DAY.
2002	755	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	756	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	757	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	758	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	759	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	760	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	761	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	762	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.

2002	763	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	764	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	765	Definite	Eye, Respiratory, Systemic	SHORTNESS OF BREATH, WHEEZING, GASPING, BURNING EYES AND THROAT, RAPID HEART RATE, RAPID BREATHING, LOWERED OXYGEN LEVEL, TOO WEAK TO WALK EVEN AFTER INITIAL TREATMENT.	45-KER-02. RESIDENTS OF A BLOCK-WIDE RESIDENTIAL AREA DEVELOPED SYMPTOMS THE EVENING AFTER AN ADJACENT FIELD WAS FUMIGATED. THIS 68-YEAR-OLD WOMAN WAS HOSPITALIZED FOR A WEEK TO STABILIZE HER COPD. SEE 2002-766, 941- 976, 1017 - 1061, AND 1462 - 1637.
2002	766	Probable	Eye, Respiratory	BURNING AND TEARING EYES, THROAT IRRITATION.	45-KER-02. SEE 2002-765. AT A CARROT PROCESSING FACILITY ALONG THE OTHER SIDE OF THE RESIDENTIAL AREA, WORKERS EXPERIENCED IRRITANT SYMPTOMS FOR A SHORT TIME. THIS WORKER WAS THE ONLY ONE TO REQUEST MEDICAL EVALUATION.
2002	862	Probable	Eye, Respiratory, Systemic	WATERY EYES, SORE THROAT, DIFFICULTY BREATHING, HEADACHE, CHEST PAIN, DRY COUGH.	AN APPLICATOR REMOVED HIS RESPIRATOR AFTER BEGINNING A SPRINKLER CHEMIGATION. THE WIND CHANGED, AND HE DEVELOPED IRRITANT SYMPTOMS. HE FAILED TO VERIFY THE SOIL TEMPERATURE TO BE WITHIN RANGE FOR THE APPLICATION. MINOR DATE DISCREPANCIES NOT RESOLVED.
2002	941	Probable	Eye, Respiratory, Systemic	BURNING EYES AND THROAT, SHORTNESS OF BREATH, HEADACHE.	45-KER-02. SEE 2002-765. APPLICATORS DID NOT APPLY THE WATER SEAL TO LATER PORTIONS OF THE FUMIGATION AS PROMPTLY AS REQUIRED. THEY ALSO ALLOWED MONITORING TO LAPSE. THREE MONTHS AFTER THE EVENT, THIS PERSON REPORTED CONTINUING NAUSEA.
2002	942	Probable	Eye, Respiratory	BURNING EYES AND THROAT, SHORTNESS OF BREATH.	45-KER-02. SEE 2002-765. WHEN THE WIND SHIFTED AND A TEMPERATURE INVERSION DEVELOPED, THE FUMIGATION WORKERS HAD LEFT AND DID NOT DETECT THE PROBLEM. THIS 9-YEAR OLD BOY HAS A HISTORY OF ASTHMA ACCORDING TO THE COMPLAINT FORM FILED BY HIS FATHER.
2002	943	Probable	Eye, Respiratory	BURNING AND TEARING EYES, BURNING THROAT.	45-KER-02. SEE 2002-765. INVESTIGATORS REVIEWED PESTICIDE USE AT FIELDS WITHIN A TWO-MILE RADIUS AND FOUND NO OTHER SOURCE OF EXPOSURE.
2002	944	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765. USE OF SWAMP COOLERS SEEMED TO EXACERBATE PROBLEMS, WHILE AIR CONDITIONING APPEARED TO PROTECT SOME PEOPLE.
2002	945	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.CDPR RAN SIMULATIONS USING LOCAL WEATHER DATA ALONG WITH MEASUREMENTS OF MITC DETECTED FOLLOWING A SIMILAR APPLICATION. PREDICTED AIR

					LEVELS OF MITC AGREED VERY CLOSELY WITH THE TIMING AND INTENSITY OF RESIDENTS? EXPERIENCES.
2002	946	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	947	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	948	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	949	Possible	Eye	VOMITING, DIARRHEA.	45-KER-02. SEE 2002-765. THIS SIX-YEAR-OLD DID NOT HAVE TYPICAL SYMPTOMS OF MITC EXPOSURE, BUT DIARRHEA HAS BEEN REPORTED IN CONNECTION WITH OTHER METAM BREAKDOWN PRODUCTS. OTHER MEMBERS OF HIS FAMILY HAD MORE TYPICAL SYMPTOMS, WHICH SUPPORTS EXPOSURE.
2002	951	Probable	Eye, Systemic	BURNING AND TEARING EYES, HEADACHE.	45-KER-02. SEE 2002-765. THIS WOMAN PROVIDED INFORMATION ABOUT HER EXTENDED FAMILY, CASES 2002-951 - 962 & 1462. A NUMBER OF THEM WERE OVERWHELMED BY ODOR WHEN THEY RETURNED FROM GROCERY SHOPPING.
2002	952	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765. THIS MAN STAYED HOME ALL DAY AND SMELLED AN ODOR THAT EVENING, THEN DEVELOPED SYMPTOMS. THE FAMILIES STAYED INSIDE AS DIRECTED, BUT SAID THAT WITH THE SWAMP COOLER RUNNING, THE ODOR WAS INTENSE.
2002	953	Probable	Eye, Systemic	BURNING AND TEARING EYES, HEADACHE.	45-KER-02. SEE 2002-765. THIS MAN ALSO REPORTED SUFFERING FROM A STOMACH ACHE, A SYMPTOM UNLIKELY TO BE CAUSED BY MITC OR METAM-SODIUM.
2002	954	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	955	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	956	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	957	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	958	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765.
2002	959	Probable	Eye, Systemic	BURNING AND TEARING EYES, NAUSEA.	45-KER-02. SEE 2002-765.THIS 5-YEAR OLD BOY AND 2 OTHER CHILDREN IN THE HOUSEHOLD WERE GIVEN BATHS BECAUSE THEIR EYES WERE BURNING SO BADLY.
2002	960	Probable	Eye, Systemic	BURNING AND TEARING EYES, NAUSEA.	45-KER-02. SEE 2002-765.
2002	961	Probable	Eye	BURNING AND TEARING EYES, NAUSEA (LISTED, BUT RELIABILITY QUESTIONABLE DUE TO HER YOUTH).	45-KER-02. SEE 2002-765.
2002	962	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765.
2002	963	Probable	Eye, Respiratory, Systemic	SORE THROAT, BURNING AND TEARING EYES, HEADACHE.	45-KER-02. SEE 2002-765. SHE WAS IN THE FRONT YARD WHEN SHE DEVELOPED SYMPTOMS.
2002	966	Possible	Respiratory,	HEADACHE, RUNNY NOSE.	45-KER-02. SEE 2002-765. THIS BOY'S FATHER REPORTED THE BOY

			Systemic		DEVELOPED SYMPTOMS WHILE MOWING THE LAWN EARLY THE NEXT MORNING.
2002	969	Possible	Systemic	HEADACHE.	45-KER-02. SEE 2002-765.
2002	971	Probable	Eye, Respiratory	MORE DIFFICULTY BREATHING THAN USUAL, BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765. THIS ELDERLY WOMAN USES AN OXYGEN MACHINE, BUT FELT LIKE SHE NEEDED TO USE HER MACHINE MORE THAT DAY. USING AN AIR CONDITIONER KEPT THE ODOR OUT OF THE HOUSE.
2002	972	Probable	Skin, Eye, Respiratory, Systemic	BURNING AND TEARING EYES, PHOTOPHOBIA, BURNING NOSE, HEADACHE, RASH AROUND THE LIPS AND EYES.	45-KER-02. SEE 2002-765. THE INVESTIGATION DOES NOT INDICATE WHETHER SHE SMELLED AN ODOR OR NOT.
2002	973	Probable	Skin, Eye, Respiratory, Systemic	BURNING EYES AND NOSE, RASH ALL OVER THE BODY, HEADACHE.	45-KER-02. SEE 2002-765. THIS WOMAN SOUGHT MEDICAL ATTENTION "A COUPLE OF" DAYS LATER, BUT PROVIDED NO INFORMATION ABOUT THE DOCTOR.
2002	974	Probable	Eye, Systemic	BURNING AND TEARING EYES, NAUSEA, HEADACHE, TINGLING FEELING ON THE ARMS, INCREASED WEAKNESS AND FATIGUE.	45-KER-02. SEE 2002-765. THIS WOMAN SUFFERS FROM A CHRONIC DISEASE AND REPORTS HAVING HEADACHES FREQUENTLY. SHE CALLED HER DOCTOR AND WAS ADVISED TO CONTINUE TAKING TYLENOL.
2002	975	Probable	Eye, Systemic	SLIGHT HEADACHE, BURNING EYES.	45-KER-02. SEE 2002-765. THIS RESIDENT OBSERVED THE APPLICATION AND DEVELOPED SYMPTOMS DURING THE DAY. HIS EYE SYMPTOMS WERE WORSE THAT EVENING.
2002	976	Probable	Eye, Respiratory, Systemic	IRRITATED EYES, IRRITATED AND SORE THROAT, SHORTNESS OF BREATH, DIARRHEA, HEADACHE.	45-KER-02. SEE 2002-765. THIS WOMAN SPENT THE AFTERNOON WATERING HER PLANTS OUTDOORS. WHEN SHE SMELLED AN ODOR, SHE DEVELOPED SYMPTOMS AND WENT INSIDE HER HOUSE.
2002	1017	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765.
2002	1019	Probable	Eye	BURNING AND WATERY EYES.	45-KER-02. SEE 2002-765. THIS WOMAN SAID THAT ANOTHER ADULT AND FIVE CHILDREN, HER OWN AND HER SISTER'S, WERE EXPOSED. THE CHILDREN RANGED FROM EIGHT MONTHS TO NINE YEARS IN AGE. THE COMPLAINT REPORT PROVIDES NO INFORMATION ABOUT THEIR EXPERIENCES.
2002	1020	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765.
2002	1021	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765.
2002	1022	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765.
2002	1023	Probable	Eye, Systemic	WATERY EYES, BLURRED VISION, VOMITING.	45-KER-02. SEE 2002-765.
2002	1024	Probable	Eye, Respiratory, Systemic	HEADACHE, WATERY EYES, DIFFICULTY BREATHING.	45-KER-02. SEE 2002-765. THIS PERSON IS A MEMBER OF A HOUSEHOLD IN WHICH ONE PARENT REPORTED THAT "ALL EXPERIENCED" CERTAIN SYMPTOMS, AND THAT SOME BUT NOT ALL VOMITED.
2002	1025	Probable	Skin, Eye,	RED AND ITCHY RASH,	45-KER-02. SEE 2002-765. THIS RESIDENT PROVIDED INFORMATION

			Respiratory, Systemic	HEADACHE, WATERY EYES, DIFFICULTY BREATHING.	ON FAMILY MEMBERS REFLECTED IN CASES 2002-1024 THROUGH 1034.
2002	1026	Probable	Eye, Respiratory	BURNING AND TEARING EYES, SORE THROAT.	45-KER-02. SEE 2002-765.
2002	1027	Probable	Eye, Respiratory	NOSEBLEEDS, BURNING EYES.	45-KER-02. SEE 2002-765. THIS PERSON IS A MEMBER OF A HOUSEHOLD IN WHICH ONE PARENT REPORTED THAT "ALL EXPERIENCED" CERTAIN SYMPTOMS, AND THAT SOME BUT NOT ALL VOMITED.
2002	1028	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765. THIS PERSON IS A MEMBER OF A HOUSEHOLD IN WHICH ONE PARENT REPORTED THAT "ALL EXPERIENCED" CERTAIN SYMPTOMS, AND THAT SOME BUT NOT ALL VOMITED.
2002	1029	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765. THIS PERSON IS A MEMBER OF A HOUSEHOLD IN WHICH ONE PARENT REPORTED THAT "ALL EXPERIENCED" CERTAIN SYMPTOMS, AND THAT SOME BUT NOT ALL VOMITED.
2002	1030	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765. THIS PERSON IS A MEMBER OF A HOUSEHOLD IN WHICH ONE PARENT REPORTED THAT "ALL EXPERIENCED" CERTAIN SYMPTOMS, AND THAT SOME BUT NOT ALL VOMITED.
2002	1031	Probable	Eye, Respiratory	NOSEBLEEDS, BURNING EYES.	45-KER-02. SEE 2002-765. THIS PERSON IS A MEMBER OF A HOUSEHOLD IN WHICH ONE PARENT REPORTED THAT "ALL EXPERIENCED" CERTAIN SYMPTOMS, AND THAT SOME BUT NOT ALL VOMITED.
2002	1032	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765. THIS PERSON IS A MEMBER OF A HOUSEHOLD IN WHICH ONE PARENT REPORTED THAT "ALL EXPERIENCED" CERTAIN SYMPTOMS, AND THAT SOME BUT NOT ALL VOMITED.
2002	1033	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765. THIS PERSON IS A MEMBER OF A HOUSEHOLD IN WHICH ONE PARENT REPORTED THAT "ALL EXPERIENCED" CERTAIN SYMPTOMS, AND THAT SOME BUT NOT ALL VOMITED.
2002	1034	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765. THIS PERSON IS A MEMBER OF A HOUSEHOLD IN WHICH ONE PARENT REPORTED THAT "ALL EXPERIENCED" CERTAIN SYMPTOMS, AND THAT SOME BUT NOT ALL VOMITED.
2002	1035	Probable	Eye, Respiratory, Systemic	IRRITATED AND SWOLLEN EYES, SORE AND IRRITATED THROAT, NAUSEA.	45-KER-02. SEE 2002-765. IN HER COMPLAINT, THIS WOMAN DID NOT STATE WHETHER SHE SMELLED AN ODOR OR NOT.
2002	1036	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765. THIS PERSON DID NOT STATE WHETHER SHE SMELLED AN ODOR OR NOT.
2002	1037	Probable	Eye,	BURNING EYES AND THROAT,	45-KER-02. SEE 2002-765.

			Respiratory, Systemic	VOMITING, SHORTNESS OF BREATH, NAUSEA, WEAKNESS, HEADACHE.	
2002	1038	Probable	Skin, Eye, Respiratory, Systemic	BURNING EYES AND THROAT, NAUSEA, HEADACHE, RASH ON THE HANDS AND FACE, VOMITING.	45-KER-02. SEE 2002-765. THIS MAN SUPPLIED INFORMATION ABOUT HIS WIFE (CASE 2002-1037) AND CHILDREN (CASES 2002-1471 - 1474).
2002	1039	Probable	Respiratory, Systemic	DIZZINESS, DIFFICULTY BREATHING.	1039: 45-KER-02. SEE 2002-765. THIS PERSON WAS LISTED AS A MEMBER OF A HOUSEHOLD IN WHICH ONE ADULT REPORTED THAT ALL WERE DIZZY AND HAD TROUBLE BREATHING. ADDITIONAL SYMPTOMS WERE LISTED BUT NOT ASSOCIATED WITH INDIVIDUAL VICTIMS.
2002	1040	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, DIZZINESS, DIFFICULTY BREATHING.	45-KER-02. SEE 2002-765. THIS PERSON WAS LISTED AS A MEMBER OF A HOUSEHOLD IN WHICH ONE ADULT REPORTED THAT ALL WERE DIZZY AND HAD TROUBLE BREATHING. ADDITIONAL SYMPTOMS WERE LISTED BUT NOT ASSOCIATED WITH INDIVIDUAL VICTIMS.
2002	1041	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765. THE COMPLAINT FORM DOES NOT STATE WHETHER THE RESIDENTS OF THIS HOUSEHOLD SMELLED AN ODOR OR NOT.
2002	1042	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, HEADACHE, DIZZINESS, DIFFICULTY BREATHING.	45-KER-02. SEE 2002-765. THIS PERSON WAS IN AN OUT OF HIS HOUSE ALL DAY. HE PROVIDED INFORMATION ON FAMILY MEMBERS INVOLVED IN CASES 2002-1039, 1040, AND 1043 - 1046.
2002	1043	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, DIZZINESS, DIFFICULTY BREATHING.	45-KER-02. SEE 2002-765. THIS PERSON WAS LISTED AS VISITING A HOUSEHOLD IN WHICH ONE ADULT REPORTED THAT ALL WERE DIZZY AND HAD TROUBLE BREATHING. ADDITIONAL SYMPTOMS WERE LISTED BUT NOT ASSOCIATED WITH INDIVIDUAL VICTIMS.
2002	1044	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, DIZZINESS, DIFFICULTY BREATHING.	45-KER-02. SEE 2002-765. THIS PERSON WAS LISTED AS A MEMBER OF A HOUSEHOLD IN WHICH ONE ADULT REPORTED THAT ALL WERE DIZZY AND HAD TROUBLE BREATHING. ADDITIONAL SYMPTOMS WERE LISTED BUT NOT ASSOCIATED WITH INDIVIDUAL VICTIMS.
2002	1045	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, DIZZINESS, DIFFICULTY BREATHING.	45-KER-02. SEE 2002-765. THIS PERSON WAS LISTED AS A MEMBER OF A HOUSEHOLD IN WHICH ONE ADULT REPORTED THAT ALL WERE DIZZY AND HAD TROUBLE BREATHING. ADDITIONAL SYMPTOMS WERE LISTED BUT NOT ASSOCIATED WITH INDIVIDUAL VICTIMS.
2002	1046	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, DIZZINESS, DIFFICULTY BREATHING.	45-KER-02. SEE 2002-765. THIS PERSON WAS LISTED AS A MEMBER OF A HOUSEHOLD IN WHICH ONE ADULT REPORTED THAT ALL WERE DIZZY AND HAD TROUBLE BREATHING. ADDITIONAL SYMPTOMS WERE LISTED BUT NOT ASSOCIATED WITH INDIVIDUAL VICTIMS.

2002	1047	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1048	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765. THIS TEEN-AGER SUPPLIED INFORMATION FOR CASES 2002-1041, 1047, 1052, 1059, AND 1060. SHE DID NOT MENTION WHETHER OR NOT ODOR WAS NOTICEABLE.
2002	1049	Probable	Eye	BURNING AND ITCHY EYES.	45-KER-02. SEE 2002-765. THIS MOTHER'S COMPLAINT FORM IDENTIFIES SYMPTOMS FOR CASES 2002-1050, 1051, AND 1511, BUT DOES NOT MENTION WHETHER THE FAMILY SMELLED AN ODOR OR NOT.
2002	1050	Probable	Eye	BURNING AND ITCHY EYES.	45-KER-02. SEE 2002-765.
2002	1051	Probable	Eye	BURNING AND ITCHY EYES.	45-KER-02. SEE 2002-765.
2002	1052	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1053	Probable	Eye, Systemic	BURNING AND TEARING EYES, HEADACHE, NAUSEA.	45-KER-02. SEE 2002-765. THE 6 FAMILY MEMBERS ALL COMPLAINED OF SYMPTOMS. THEY LEFT THE AREA FOR A FEW HOURS AND THEIR SYMPTOMS DISSIPATED, BUT RETURNED WHEN THEY CAME BACK HOME. THE COMPLAINT FORM MENTIONS NOTHING ABOUT AN ODOR.
2002	1054	Probable	Eye, Systemic	BURNING AND TEARING EYES, HEADACHE, NAUSEA.	45-KER-02. SEE 2002-765. THIS PERSON WAS SAID TO HAVE CONTINUING HEADACHES 14 DAYS AFTER THE ONSET OF INITIAL SYMPTOMS.
2002	1055	Probable	Eye, Systemic	BURNING AND TEARING EYES, HEADACHE, NAUSEA.	45-KER-02. SEE 2002-765.
2002	1056	Probable	Eye, Systemic	BURNING AND TEARING EYES, HEADACHE, LOSS OF APPETITE.	45-KER-02. SEE 2002-765. ACCORDING TO THE REPORT, THIS CHILD ALSO LOST HIS APPETITE AND LOST WEIGHT.
2002	1057	Probable	Eye, Systemic	BURNING AND TEARING EYES, HEADACHE, NAUSEA.	45-KER-02. SEE 2002-765. THIS YOUNG MAN PROVIDED INFORMATION ON THE SIX MEMBERS OF HIS FAMILY, CASES 2002 1053 - 1058.
2002	1058	Probable	Eye, Systemic	BURNING AND TEARING EYES, HEADACHE, NAUSEA.	45-KER-02. SEE 2002-765.
2002	1059	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1060	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1061	Probable	Eye, Systemic	EYE IRRITATION, DIARRHEA.	45-KER-02. SEE 2002-765.
2002	1147	Probable	Eye, Systemic	BURNING EYES, HEADACHE.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 5. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES AND HEADACHES.
2002	1148	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	1149	Probable	Eye	BURNING EYES.	35-KER-02. SEE 2002-425. THIS WORKER BELONGED TO CREW 4. ACCORDING TO THE FOREMAN, THE CREW SUFFERED BURNING EYES.
2002	1176	Probable	Eye,	TEARING EYES, NAUSEA,	64-FRE-02. FOUR WATER DISTRICT EMPLOYEES DEVELOPED

			Respiratory, Systemic	HEADACHE, SORE THROAT, SWEATING, NASAL IRRITATION, RUNNY NOSE WITH YELLOWISH MUCOUS, COUGHING UP YELLOW PHLEGM.	SYMPTOMS WHEN THEY SMELLED AN ODOR FROM A METAM-SODIUM APPLICATION TO A NEARBY FIELD. A FEDERAL WORKER WHO ACCOMPANIED THEM WAS SIMILARLY AFFECTED. SEE 2002-1177 ? 1180.
2002	1177	Probable	Skin, Eye, Respiratory, Systemic	TINGLING AND BURNING SKIN, RED BLOTCHES ON THE FOREARMS, BURNING SENSATION IN THE NOSE, BURNING AND TEARING EYES, SLIGHT NAUSEA.	64-FRE-02. SEE 2002-1176. INVESTIGATION FOUND APPLICATION VIOLATIONS: THE APPLICATOR MONITORED FOR ODOR HIMSELF RATHER THAN HAVING AN UNEXPOSED WORKER DO IT, TERMINATED MONITORING SHORT OF THE REQUIRED 12 HOURS, AND DID NOT MEASURE SOIL TEMPERATURE.
2002	1178	Probable	Skin, Eye, Respiratory, Systemic	RUNNY NOSE, BURNING EYES, NAUSEA, RED BLOTCHES ON THE ARMS AND FACE.	64-FRE-02. SEE 2002-1176. SINCE THE AIR TEMPERATURE WAS BELOW 90 DEGREES, AND THE INCIDENT OCCURRED DURING APPLICATION OF THE WATER SEAL, IT SEEMS UNLIKELY THAT COMPLIANCE WOULD HAVE AVOIDED EXPOSURE.
2002	1179	Probable	Eye	BURNING EYES.	64-FRE-02. SEE 2002-1176. THE FUMIGATION SUMMARY FOR THIS APPLICATION INDICATES THAT THE APPLICATOR/MONITOR DETECTED NO ODOR, ALTHOUGH THE WATER WORKERS FOUND THE SMELL OVERWHELMING.
2002	1180	Probable	Skin, Eye, Respiratory, Systemic	MUCOUS MEMBRANE IRRITATION, HEADACHE, FATIGUE, CHEST TIGHTNESS, DIFFICULTY BREATHING, BURNING EYES.	64-FRE-02. SEE 2002-1176.
2002	1440	Probable	Skin	ITCHY RASH ON BOTH FOREARMS.	AN INEXPERIENCED OPERATOR SPLASHED METAM-SODIUM ON HIS FOREARMS IN THE COURSE OF CHANGING FILTER BAGS ON THE PRODUCTION LINE. HE CONSULTED A DOCTOR 11 DAYS LATER. THE DOCTOR DIRECTED HIM TO AVOID CHEMICAL EXPOSURE UNTIL HE RECOVERED.
2002	1462	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765.
2002	1463	Probable	Eye, Respiratory	BURNING EYES AND THROAT.	45-KER-02. SEE 2002-765. ACCORDING TO FILED COMPLAINT REPORT, SHE CONTINUES TO EXPERIENCE BURNING EYES.
2002	1464	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765.
2002	1465	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, DIFFICULTY BREATHING, HEADACHE, DRY MOUTH, NAUSEA STARTING 2 DAYS LATER. WHEEZING IN ALL LUNG FIELDS ON EXAM 4 DAYS POST EXPOSURE. HISTORY OF LUNG CANCER 7 YEARS EARLIER, SEVERE CHRONIC RESTRICTIVE & OBSTRUCTIVE LUNG DISEASE.	45-KER-02. SEE 2002-765. THIS WOMAN DESCRIBED THE SMELL AS CHOPPED ONIONS AND ROTTEN EGGS.

2002	1466	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765. THIS GIRL'S FAMILY OF 4 REMAINED INSIDE THEIR HOUSE. AN ADULT CALLED THE FIRE DEPARTMENT TO FIND OUT WHAT WAS HAPPENING.
2002	1467	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1468	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1469	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765. THIS MAN PROVIDED INFORMATION ABOUT FOUR FAMILY MEMBERS, CASES 1466 - 1469.
2002	1470	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1471	Probable	Eye, Respiratory, Systemic	BURNING EYES, SORE THROAT, HEADACHE.	45-KER-02. SEE 2002-765.
2002	1472	Probable	Eye, Respiratory, Systemic	BURNING EYES, SORE THROAT, NAUSEA.	45-KER-02. SEE 2002-765.
2002	1473	Probable	Eye, Respiratory, Systemic	BURNING EYES AND THROAT, HEADACHE, VOMITING.	45-KER-02. SEE 2002-765.
2002	1474	Probable	Eye, Respiratory, Systemic	VOMITING, NAUSEA, HEADACHE, BURNING EYES AND THROAT.	45-KER-02. SEE 2002-765.
2002	1475	Probable	Respiratory	COUGHING.	45-KER-02. SEE 2002-765.
2002	1476	Probable	Eye, Respiratory	SORE THROAT, BURNING EYES.	45-KER-02. SEE 2002-765. THIS WOMAN AND HER HUSBAND (2002-1475) WERE OUTSIDE HAVING A BARBECUE AT THEIR HOME. THEY WENT INSIDE THE HOUSE WHEN THEY SMELLED AN ODOR AND DEVELOPED SYMPTOMS.
2002	1477	Probable	Eye, Systemic	BURNING EYES, VOMITING, HEADACHE.	45-KER-02. SEE 2002-765.
2002	1478	Probable	Eye, Systemic	BURNING AND TEARING EYES, HEADACHE.	45-KER-02. SEE 2002-765. THIS MAN'S QUESTIONNAIRE DOES NOT MENTION WHETHER HE SMELLED AN ODOR OR NOT.
2002	1479	Probable	Eye, Respiratory	BURNING AND TEARING EYES, COUGHING.	45-KER-02. SEE 2002-765. THE QUESTIONNAIRE FOR THIS MAN AND HIS WIFE (2002-1480) MADE NO MENTION WHETHER THEY SMELLED AN ODOR OR NOT. IT DID MENTION CHILDREN, POSSIBLY OVERLAPPING WITH CASES 2002-1049 - 1051 AND 1511.
2002	1480	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1481	Probable	Eye, Respiratory	BURNING EYES AND THROAT.	45-KER-02. SEE 2002-765.
2002	1482	Probable	Eye, Systemic	BURNING EYES, BAD TASTE IN THE MOUTH.	45-KER-02. SEE 2002-765.
2002	1483	Probable	Eye, Systemic	BURNING EYES, NAUSEA.	45-KER-02. SEE 2002-765.
2002	1484	Probable	Eye, Respiratory,	BURNING EYES, HEADACHE, VOMITING, SORE THROAT,	45-KER-02. SEE 2002-765.

			Systemic	DIZZINESS.	
2002	1485	Probable	Eye, Systemic	BURNING AND TEARY EYES, HEADACHE, UPSET STOMACH, DIZZINESS.	45-KER-02. SEE 2002-765. THE CHILDREN WERE PLAYING IN THEIR BACKYARD WHEN THEY SMELLED AN ODOR AND DEVELOPED SYMPTOMS.
2002	1486	Probable	Eye, Respiratory	BURNING AND TEARING EYES, COUGHING, SORE THROAT.	45-KER-02. SEE 2002-765.
2002	1487	Probable	Eye, Systemic	BURNING AND TEARY EYES, HEADACHE, UPSET STOMACH, DIZZINESS.	45-KER-02. SEE 2002-765.
2002	1488	Probable	Eye, Respiratory	BURNING AND TEARING EYES, COUGHING, SORE THROAT.	45-KER-02. SEE 2002-765.
2002	1489	Probable	Eye, Respiratory	BURNING AND TEARING EYES, COUGHING, SORE THROAT.	45-KER-02. SEE 2002-765.
2002	1490	Probable	Eye, Respiratory	BURNING AND TEARING EYES, COUGHING, SORE THROAT, DIFFICULTY BREATHING.	45-KER-02. SEE 2002-765. THIS MOTHER PROVIDED INFORMATION ON THE FIVE MEMBERS OF HER FAMILY, CASES 2002-1486, 1488, 1489, 1490, AND 1495.
2002	1491	Probable	Eye, Respiratory	BURNING AND TEARY EYES, HEADACHE, UPSET STOMACH, DIZZINESS.	45-KER-02. SEE 2002-765. THIS MAN PROVIDED INFORMATION ABOUT HIS WIFE AND CHILDREN (CASES 2002-1485, 1487, 1492 - 1494, AND 1496).
2002	1492	Probable	Eye, Systemic	BURNING AND TEARY EYES, HEADACHE, UPSET STOMACH, DIZZINESS.	45-KER-02. SEE 2002-765.
2002	1493	Probable	Eye, Systemic	BURNING AND TEARY EYES, HEADACHE, UPSET STOMACH, DIZZINESS.	45-KER-02. SEE 2002-765.
2002	1494	Probable	Eye, Systemic	BURNING AND TEARY EYES, HEADACHE, UPSET STOMACH, DIZZINESS.	45-KER-02. SEE 2002-765.
2002	1495	Probable	Eye, Respiratory	BURNING AND TEARING EYES, COUGHING, SORE THROAT.	45-KER-02. SEE 2002-765.
2002	1496	Probable	Eye, Systemic	BURNING AND TEARY EYES, HEADACHE, UPSET STOMACH, DIZZINESS.	45-KER-02. SEE 2002-765.
2002	1497	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, SORE THROAT, POSSIBLY COUGHING, RASPY BREATHING, BURNING NOSE, HEADACHE, NAUSEA, VOMITING, PANIC (SYMPTOMS LISTED FOR GROUP, WITHOUT INDIVIDUAL ATTRIBUTION).	45-KER-02. SEE 2002-765. THIS WOMAN ATTENDED A WAKE AT A HOUSE NEAR THE FIELD. THE HOMEOWNER REPORTED THEY WERE OUTSIDE WHEN THEY DEVELOPED SYMPTOMS. ONE ELDERLY WOMAN (2002-765) SOUGHT MEDICAL CARE.
2002	1498	Probable	Eye,	BURNING EYES AND THROAT.	45-KER-02. SEE 2002-765.

			Respiratory		
2002	1499	Probable	Eye, Respiratory	BURNING EYES AND THROAT.	45-KER-02. SEE 2002-765.
2002	1500	Probable	Eye, Respiratory	BURNING EYES AND THROAT.	45-KER-02. SEE 2002-765.
2002	1501	Probable	Eye, Respiratory	BURNING EYES AND THROAT.	45-KER-02. SEE 2002-765.
2002	1502	Probable	Eye, Respiratory	BURNING EYES AND THROAT.	45-KER-02. SEE 2002-765.
2002	1503	Probable	Eye, Respiratory	BURNING EYES AND THROAT.	45-KER-02. SEE 2002-765.
2002	1504	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, SORE THROAT, POSSIBLY COUGHING, RASPY BREATHING, BURNING NOSE, HEADACHE, NAUSEA, VOMITING, PANIC (SYMPTOMS LISTED FOR GROUP, WITHOUT INDIVIDUAL ATTRIBUTION).	45-KER-02. SEE 2002-765.
2002	1505	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765. THIS PERSON DEVELOPED SYMPTOMS WHILE INSIDE THE HOUSE. SHE FELT WORSE WHEN SHE LEFT THE HOUSE BRIEFLY TO CHECK ON A SPRINKLER. SHE RETURNED INDOORS, WHERE HER SYMPTOMS CONTINUED TO WORSEN. SHE SMELLED NO ODOR.
2002	1506	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765. ALONG WITH HER DAUGHTER (2002-1505), SHE SMELLED NO ODOR, BUT DEVELOPED SYMPTOMS.
2002	1507	Probable	Eye, Systemic	BURNING EYES, DIZZINESS, HEADACHE.	45-KER-02. SEE 2002-765. THIS WOMAN HOSTED A POOL PARTY THE DAY OF THE INCIDENT. THINKING THE POOL CHLORINE AFFECTED THE EYES OF THE KIDS IN THE POOL, SHE FLUSHED THEIR EYES WITH SALINE SOLUTION. SHE DID NOT MENTION WHETHER SHE SMELLED AN ODOR OR NOT.
2002	1508	Probable	Eye, Respiratory, Systemic	BURNING AND WATERY EYES, DIFFICULTY BREATHING, COUGHING, HEADACHE.	45-KER-02. SEE 2002-765. THIS MAN AND HIS GIRLFRIEND NOTICED AN ODOR AND SUFFERED BURNING AND TEARING EYES WHILE IN THE HOUSE. WHILE CHECKING FOR THE ODOR SOURCE, HE WALKED OUTSIDE WHERE HE REPORTED THE PRESENCE OF A MUCH STRONGER ODOR.
2002	1509	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1510	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1511	Probable	Eye	BURNING AND ITCHY EYES.	45-KER-02. SEE 2002-765.
2002	1512	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, SORE THROAT, POSSIBLY COUGHING, RASPY BREATHING,	45-KER-02. SEE 2002-765.

				BURNING NOSE, HEADACHE, NAUSEA, VOMITING, PANIC (SYMPTOMS LISTED FOR GROUP, WITHOUT INDIVIDUAL ATTRIBUTION).	
2002	1513	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, SORE THROAT, POSSIBLY COUGHING, RASPY BREATHING, BURNING NOSE, HEADACHE, NAUSEA, VOMITING, PANIC (SYMPTOMS LISTED FOR GROUP, WITHOUT INDIVIDUAL ATTRIBUTION).	45-KER-02. SEE 2002-765.
2002	1514	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, SORE THROAT, POSSIBLY COUGHING, RASPY BREATHING, BURNING NOSE, HEADACHE, NAUSEA, VOMITING, PANIC (SYMPTOMS LISTED FOR GROUP, WITHOUT INDIVIDUAL ATTRIBUTION).	45-KER-02. SEE 2002-765.
2002	1515	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, SORE THROAT, POSSIBLY COUGHING, RASPY BREATHING, BURNING NOSE, HEADACHE, NAUSEA, VOMITING, PANIC (SYMPTOMS LISTED FOR GROUP, WITHOUT INDIVIDUAL ATTRIBUTION).	45-KER-02. SEE 2002-765.
2002	1516	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, SORE THROAT, RASPY COUGH, SINUS HEADACHE.	45-KER-02. SEE 2002-765. THIS WOMAN PROVIDED NAMES OF 11 OF THE 15 PEOPLE VISITING HER HOME THE EVENING BEFORE HER MOTHER'S FUNERAL (CASES 2002-765, 1497, 1504, 1512 - 1516, 1538, 1558, AND 1562) AND LISTED SYMPTOMS THEY EXPERIENCED.
2002	1517	Probable	Eye, Systemic	BURNING, TEARING AND SWOLLEN EYES, HEADACHE.	45-KER-02. SEE 2002-765. THIS WOMAN RETURNED HOME THAT EVENING. WHEN SHE WENT OUTSIDE TO FEED HER ANIMALS, SHE DEVELOPED IRRITANT SYMPTOMS. SHE DID NOT MENTION IN HER COMPLAINT WHETHER SHE SMELLED AN ODOR OR NOT.
2002	1518	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765.
2002	1519	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765.
2002	1520	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765.
2002	1521	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765.
2002	1522	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.

2002	1523	Probable	Eye, Systemic	BURNING AND TEARING EYES, HEADACHE.	45-KER-02. SEE 2002-765. THIS WOMAN DEVELOPED SYMPTOMS WITHIN A SHORT DISTANCE OF BEGINNING TO JOG. SHE RETURNED HOME AND FLUSHED HER EYES WITH WATER. HER MOTHER AND 2 NEPHEWS REMAINED IN THE HOUSE AND SUFFERED NO ILL EFFECTS.
2002	1525	Probable	Eye, Respiratory	BURNING AND TEARING EYES, SORE THROAT.	45-KER-02. SEE 2002-765. THIS WOMAN PROVIDED INFORMATION ON THE SIX MEMBERS OF HER FAMILY (CASES 2002-1525, 1543, 1545, 1547, 1548, AND 1549), WHO WERE EATING DINNER WHEN THEY SMELLED AN ODOR AS OF SOMETHING BURNING AND DEVELOPED SYMPTOMS.
2002	1526	Possible	Skin, Respiratory	BURNING FEELING ON THE SKIN, DIFFICULTY BREATHING.	45-KER-02. SEE 2002-765. THIS MAN DEVELOPED SYMPTOMS THE DAY AFTER THE INCIDENT.
2002	1527	Probable	Eye, Respiratory	BURNING AND TEARING EYES, SORE THROAT.	45-KER-02. SEE 2002-765. THE QUESTIONNAIRE FOR THIS MAN AND HIS WIFE AND CHILDREN (2002-1528 - 1531) DOES NOT MENTION WHETHER THEY SMELLED AN ODOR OR NOT.
2002	1528	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1529	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1530	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1531	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1532	Probable	Eye, Respiratory	BURNING EYES, SORE THROAT.	45-KER-02. SEE 2002-765. THIS BOY ATTENDED A POOL PARTY ALONG WITH HIS FAMILY. THE FAMILY FLUSHED THEIR BURNING EYES WITH SALINE SOLUTION. THE COMPLAINT FORM MENTIONS NOTHING ABOUT WHETHER THEY SMELLED AN ODOR OR NOT.
2002	1533	Probable	Eye, Respiratory	BURNING EYES, SORE THROAT.	45-KER-02. SEE 2002-765.
2002	1534	Probable	Eye, Respiratory	BURNING EYES, SORE THROAT.	45-KER-02. SEE 2002-765.
2002	1535	Probable	Eye	BURNING EYES, SORE THROAT.	45-KER-02. SEE 2002-765. THIS WOMAN PROVIDED INFORMATION ABOUT HER CHILDREN (CASES 2002-1532 - 1534) WHO HAD BEEN AT A POOL PARTY. ACCORDING TO THE HOSTESS (CASE 2002-1507), THERE WERE 15 GUESTS. THE REST OF THEM WERE NOT IDENTIFIED.
2002	1536	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765. THIS WOMAN HAD A PREEXISTING COLD, WHICH INCLUDED A SORE THROAT AND COUGHING. SHE SUFFERED IRRITANT EYE EFFECTS.
2002	1537	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765. THIS MAN REPORTED BEING IN AND OUT OF THE HOUSE ALL DAY. HE NOTED GOING OUTSIDE TO CHECK THE SIDE OF THE HOUSE AND NOTED THE ODOR BEING STRONGER NEAR THE SWAMP COOLER.
2002	1538	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, SORE THROAT, POSSIBLY COUGHING, RASPY BREATHING,	45-KER-02. SEE 2002-765.

				BURNING NOSE, HEADACHE, NAUSEA, VOMITING, PANIC (SYMPTOMS LISTED FOR GROUP, WITHOUT INDIVIDUAL ATTRIBUTION).	
2002	1539	Possible	Systemic	SLIGHT HEADACHE.	45-KER-02. SEE 2002-765. THIS PERSON RODE HIS BIKE TO GO TO THE STORE. WHILE RIDING BACK HOME, HE DEVELOPED A HEADACHE.
2002	1540	Probable	Eye, Respiratory	BURNING AND TEARING EYES, SORE THROAT, COUGHING.	45-KER-02. SEE 2002-765.
2002	1541	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, SORE THROAT, STOMACH ACHE.	45-KER-02. SEE 2002-765.
2002	1542	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765. AIR CONDITIONING KEPT THE ODOR OUT OF THE HOUSE.
2002	1543	Probable	Eye, Respiratory	BURNING AND TEARING EYES, SORE THROAT.	45-KER-02. SEE 2002-765. THE FAMILY DESCRIBED THE ODOR AS "SOMETHING BURNING".
2002	1544	Probable	Eye, Systemic	BURNING AND TEARING EYES, NAUSEA.	45-KER-02. SEE 2002-765. THIS MAN SAID SEVEN RESIDENTS (CASES 2002-1470, 1509, 1510, 1522, 1544, 1546, AND 1557) WERE IN THE HOUSE, SMELLED AN ODOR AND DEVELOPED SYMPTOMS. THEY ASKED AT THE PACKING SHED ACROSS THE STREET, AND FOUND IT WAS NOT THE SOURCE.
2002	1545	Probable	Eye, Respiratory	BURNING AND TEARING EYES, SORE THROAT.	45-KER-02. SEE 2002-765.
2002	1546	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1547	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, SORE THROAT, HEADACHE.	45-KER-02. SEE 2002-765.
2002	1548	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, SORE THROAT, HEADACHE.	45-KER-02. SEE 2002-765.
2002	1549	Probable	Eye, Respiratory	BURNING AND TEARING EYES, SORE THROAT.	45-KER-02. SEE 2002-765. THIS MAN'S EYE SYMPTOMS LASTED FOR 3 DAYS.
2002	1550	Probable	Eye, Respiratory	BURNING EYES AND THROAT.	45-KER-02. SEE 2002-765.
2002	1551	Probable	Eye, Respiratory	BURNING AND TEARING EYES, SORE THROAT, COUGHING.	45-KER-02. SEE 2002-765. THIS WOMAN PROVIDED INFORMATION ABOUT HERSELF AND HER RELATIVES (CASES 2002-1540, 1541, 1551, 1552, AND 1553). EVERYONE WAS OUTSIDE EXCEPT HER. HER SYMPTOMS WORSENED WHEN SHE WENT OUT TO CHECK ON THEM.
2002	1552	Probable	Eye, Respiratory	BURNING AND TEARING EYES, SORE THROAT, COUGHING.	45-KER-02. SEE 2002-765.

2002	1553	Probable	Eye, Respiratory	BURNING AND TEARING EYES, SORE THROAT.	45-KER-02. SEE 2002-765.
2002	1554	Probable	Eye	SLIGHTLY STINGING EYES.	45-KER-02. SEE 2002-765. ORIGINALLY, THIS WOMAN DID NOT FILL OUT A COMPLAINT FORM BECAUSE SHE THOUGHT HER SYMPTOMS MAY HAVE BEEN FROM EYE MEDICATION AND NOT THE PESTICIDE. SHE HAD ONLY MILD AND TRANSIENT SYMPTOMS, AND DID NOT MENTION ODOR.
2002	1555	Probable	Eye, Respiratory, Systemic	BURNING EYES AND THROAT, NAUSEA.	45-KER-02. SEE 2002-765. THIS WOMAN PROVIDED INFORMATION ABOUT NINE EXPOSED FAMILY MEMBERS, (2002-1481, 1498, 1499, 1500 - 1503, 1550, & 1555). THEY SPOKE THAT EVENING WITH AN IRRIGATOR THEY KNEW AND WERE TOLD THAT AN APPLICATION WAS IN PROGRESS.
2002	1556	Probable	Eye, Respiratory	BURNING AND TEARING EYES, SORE THROAT.	45-KER-02. SEE 2002-765. THIS MAN SAID HIS EYES FELT LIKE SOMEONE SPRAYED PEPPER IN THEM.
2002	1557	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1558	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, SORE THROAT, POSSIBLY COUGHING, RASPY BREATHING, BURNING NOSE, HEADACHE, NAUSEA, VOMITING, PANIC (SYMPTOMS LISTED FOR GROUP, WITHOUT INDIVIDUAL ATTRIBUTION).	45-KER-02. SEE 2002-765.
2002	1559	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765.
2002	1560	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765.
2002	1561	Probable	Eye, Respiratory	BURNING EYES, SORE THROAT.	45-KER-02. SEE 2002-765. THIS MAN PROVIDED INFORMATION ON HIS FAMILY, CASES 2002-1559 - 1561. THEY HAD BEEN AWAY. WHEN THEY RETURNED THAT EVENING, THEY SMELLED A FOUL ODOR AND DEVELOPED SYMPTOMS.
2002	1562	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, SORE THROAT, POSSIBLY COUGHING, RASPY BREATHING, BURNING NOSE, HEADACHE, NAUSEA, VOMITING, PANIC (SYMPTOMS LISTED FOR GROUP, WITHOUT INDIVIDUAL ATTRIBUTION).	45-KER-02. SEE 2002-765.
2002	1563	Probable	Eye, Respiratory	BURNING AND TEARING EYES, HEAD CONGESTION, DIFFICULTY BREATHING.	45-KER-02. SEE 2002-765.
2002	1564	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765. THIS WOMAN FELT HER EYES BEGIN BURNING WHEN SHE STEPPED OUT OF THE SHOWER. SHE

					DESCRIBED AN ODOR AS "PROPANE-LIKE" AND CHECKED TO MAKE SURE HER STOVE HAD BEEN TURNED OFF.
2002	1565	Probable	Eye	BURNING EYES.	45-KER-02. SEE 2002-765.
2002	1567	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765. THE PACKING HOUSE WORKERS FELT THEIR EYES BURNING AND TEARING, BUT SMELLED NO ODOR. PLANT MANAGERS EVACUATED THE WORKERS TO AN OUTSIDE AREA. MAINTENANCE PERSONNEL CHECKED THE PLANT FOR CHLORINE AND AMMONIA LEAKS, BUT FOUND NONE.
2002	1568	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765. UPON EVACUATING THE PLANT, THE WORKERS NOTICED THE NEIGHBORING RESIDENTS IN THE STREET AS WELL. SEVERAL RESIDENTS INQUIRED IF THE PACKING SHED HAD A CHEMICAL LEAK.
2002	1569	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1570	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1571	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1572	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1573	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1574	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1575	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1576	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1577	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1578	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1579	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1580	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1581	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1582	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1583	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1584	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1585	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1586	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1587	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1588	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1589	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1590	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1591	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1592	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1593	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1594	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1595	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.

2002	1596	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1597	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1598	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1599	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1600	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1601	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1602	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1603	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1604	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1605	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1606	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1607	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1608	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1609	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1610	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1611	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1612	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1613	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1614	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1615	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1616	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1617	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1618	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1619	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1620	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1621	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1622	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1623	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1624	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1625	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1626	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1627	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1628	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1629	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1630	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1631	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1632	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.

2002	1633	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1634	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1635	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1636	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1637	Probable	Eye	BURNING AND TEARING EYES.	45-KER-02. SEE 2002-765.
2002	1684	Probable	Skin	ITCHY, RED, PAINFUL AND BLISTERY RASH ON THE WRIST, LEFT THIGH, GROIN AND TOP OF THE LEFT FOOT.	AS A WORKER FILLED A DRILLED HOLE IN A UTILITY POLE WITH METAM-SODIUM, SOME OF THE LIQUID FLICKED ONTO HIS BOOT, PANTS AND WRIST. HE WASHED HIS HANDS AND HOSED OFF HIS BOOTS, BUT NOTICED A BLISTERY RASH A FEW DAYS LATER. HE THEN SOUGHT MEDICAL ATTENTION.
2003	47	Probable	Eye, Respiratory, Systemic	DIFFICULTY BREATHING, STINGING AND WATERY EYES, HEADACHES, SORE THROAT, CHEST TIGHTNESS, SEVERE ASTHMA ATTACKS.	4-KER-03. AN AG PCO APPLIED METAM-SODIUM TO A FIELD ADJACENT TO SEVERAL RESIDENCES. THE RESIDENTS COMPLAINED OF A MANURE-LIKE ODOR. FIFTEEN REPORTED SYMPTOMS, WITH 3 SEEKING MEDICAL ATTENTION INCLUDING THIS ASTHMATIC BOY. SEE 2003 - 48 TO 60, 273.
2003	48	Probable	Eye, Respiratory, Systemic	DIFFICULTY BREATHING, SORE THROAT, MUCOUS IN THE THROAT, COUGH, CHEST PAIN, WATERY EYES, HEADACHE, JOINT PAIN.	4-KER-03. SEE 2003-47. THIRTEEN OF THE 15 PEOPLE REPORTED SMELLING THE ODOR WHILE ATTENDING A BARBECUE IN A FAMILY MEMBER'S BACKYARD.
2003	49	Probable	Eye, Respiratory, Systemic	WATERY EYES, HEADACHES, SORE THROAT, CHEST TIGHTNESS, JOINT PAIN.	4-KER-03. SEE 2003-47. THIS PERSON HAD NASAL SURGERY AND STATED SHE DID NOT SMELL ANYTHING.
2003	50	Probable	Skin, Eye, Systemic	WATERY AND BURNING EYES, TINGLING SENSATION ON THE FACE, JOINT PAIN, TIREDNESS, HEADACHES.	4-KER-03. SEE 2003-47. THIS MAN REPORTED FILING A COMPLAINT 5 YEARS EARLIER CONCERNING THE ODOR FROM A METAM-SODIUM APPLICATION.
2003	51	Probable	Eye, Respiratory, Systemic	BURNING AND WATERY EYES, HEADACHES, SORE THROAT, FLU-LIKE SYMPTOMS.	4-KER-03. SEE 2003-47. THE MOTHER REPORTED THIS 13-YR OLD SUFFERS FROM MIGRAINE HEADACHES THAT HAVE INCREASED IN INTENSITY SINCE THE EXPOSURE.
2003	52	Probable	Respiratory, Systemic	DIFFICULTY BREATHING, FLU-LIKE SYMPTOMS.	4-KER-03. SEE 2003-47.
2003	53	Probable	Eye, Respiratory, Systemic	BURNING AND WATERY EYES, CRUSTED DISCHARGE AROUND THE EYES UPON WAKING, SORE THROAT, HEADACHES, BACK PAIN.	4-KER-03. SEE 2003-47.
2003	54	Probable	Respiratory, Systemic	SORE THROAT, HEADACHES, FLU-LIKE SYMPTOMS.	4-KER-03. SEE 2003-47.
2003	55	Probable	Eye, Systemic	ITCHY AND WATERY EYES, HEADACHES, STOMACH PAIN, MUSCLE AND JOINT PAIN, SORE	4-KER-03. SEE 2003-47.

				THROAT, NAUSEA, DIARRHEA.	
2003	56	Probable	Eye, Respiratory, Systemic	RED EYES, SORE THROAT, FLU-LIKE SYMPTOMS, TIREDNESS.	4-KER-03. SEE 2003-47.
2003	57	Probable	Eye, Respiratory, Systemic	BURNING AND WATERY EYES, BAD HEADACHES, SORE THROAT, FLU-LIKE SYMPTOMS.	4-KER-03. SEE 2003-47.
2003	58	Probable	Eye, Respiratory, Systemic	BURNING AND WATERY EYES, BAD HEADACHES, SORE THROAT, CHEST TIGHTNESS, FLU-LIKE SYMPTOMS.	4-KER-03. SEE 2003-47. THIS WOMAN REPORTS SHE SUFFERS FROM MIGRAINE HEADACHES. SHE FILED A COMPLAINT 5 YEARS EARLIER ABOUT THE ODOR FROM A METAM-SODIUM APPLICATION.
2003	59	Probable	Respiratory	SORE THROAT, HOARSE VOICE.	4-KER-03. SEE 2003-47.
2003	60	Probable	Respiratory	SORE THROAT, HEAVY BREATHING.	4-KER-03. SEE 2003-47.
2003	273	Probable	Respiratory, Systemic	FLU-LIKE SYMPTOMS, STOMACH PROBLEMS, SORE THROAT, HEADACHES, BACK PAIN, ACHING LEGS, DIARRHEA.	4-KER-03. SEE 2003-47.
2003	474	Definite	Skin	ITCHY RASH ON THE FEET AND LOWER LEGS WITH LESS ON THE UPPER THIGHS AND A FEW SPOTS ON THE CHEST, SLIGHTLY SWOLLEN FEET.	AFTER TRANSFERRING METAM-SODIUM FROM A LARGER TANK TO A SMALLER TANK, AN EMPLOYEE DISCONNECTED THE HOSE AND SOME OF THE CHEMICAL SPLASHED ON HIS LEGS. HE DID NOT FLUSH OUT THE HOSE BEFORE DISCONNECTING IT. HE IMMEDIATELY RINSED HIMSELF OFF IN A SHOWER.
2003	587	Probable	Eye, Respiratory, Systemic	DIZZINESS, NAUSEA, BURNING EYES, DIFFICULTY BREATHING.	AN IRRIGATOR DEVELOPED SYMPTOMS WHILE APPLYING METAM-SODIUM BY FLOOD IRRIGATION. HE SMELLED THE CHEMICAL WHILE RELEASING IT INTO THE IRRIGATION DITCH, OPENING DITCH GATES AT THE FIELD'S EDGE AND OPENING BARRIERS SET UP INSIDE THE FIELD.
2003	713	Probable	Skin, Systemic	DIZZINESS, NAUSEA, VOMITING, ITCHING & DISCOLORED SKIN ON THE BACK, SIDES AND POSTERIOR UPPER ARMS. 8-DAYS POST: UNRELATED LEFT LOWER LOBE PNEUMONIA WHICH RESULTED IN HIS HOSPITALIZATION. THE DOCTOR ALSO FOUND UNRELATED HEART PROBLEMS.	38-IMP-03. A PRESSURE RELIEF VALVE ON THE IRRIGATION SYSTEM BROKE AND SPRAYED DILUTE METAM-SODIUM ONTO AN IRRIGATOR AS HE WALKED BY. HE SHUT OFF THE PUMP AND JUMPED INTO THE CANAL BEFORE SHOWERING AT HIS HOME NEARBY.
2003	1207	Probable	Eye	BURNING EYES.	33-RIV-03. HAZMAT CREWS RESPONDED TO COMPLAINTS OF ODOR AND IRRITANT SYMPTOMS IN THE VICINITY OF A METAM-POTASSIUM SPRINKLER APPLICATION. THIS RESIDENT WAS ABOUT 1/4 MILE FROM THE TREATED FIELD. SEE 2003- 1208 TO 1222, 1224 - 1229.

2003	1209	Probable	Eye	IRRITATED AND BURNING EYES.	33-RIV-03. SEE 2003-1207. EACH RESPONDER ENCOUNTERED RESIDENTS WITH COMPLAINTS CONSISTENT WITH FUMIGANT EXPOSURE. THIS ENVIRONMENTAL HEALTH HAZMAT CAPTAIN WAS PRESENT WHEN A FRESH CLOUD OF GAS ARRIVED, AND EXPERIENCED SYMPTOMS HIMSELF.
2003	1210	Probable	Systemic	HEADACHE.	33-RIV-03. SEE 2003-1207. THE AFFECTED RESPONDER (2003-1209) DESCRIBED HOW RESIDENTS HAD LEFT THEIR HOMES TO INVESTIGATE A NOISE AND ENCOUNTERED IRRITANT GAS OUTSIDE. HAZMAT RESPONDERS CHECKED AND RELEASED EIGHT RESIDENTS (1210 - 1217) THAT EVENING.
2003	1211	Probable	Eye, Respiratory, Systemic	HEADACHE, BURNING EYES, RAPID HEART RATE, RAPID BREATHING.	33-RIV-03. SEE 2003-1207. AFTER CHECKING THIS RESIDENT, HAZMAT RESPONDERS REFERRED HER FOR MEDICAL TREATMENT, BUT INVESTIGATION DID NOT DETERMINE WHETHER SHE RECEIVED CARE. .
2003	1213	Probable	Eye	BURNING EYES.	33-RIV-03. SEE 2003-1207. THE INVESTIGATORS DETERMINED THE FUMIGATION WORKERS HAD NOT MONITORED CONDITIONS APPROPRIATELY. APPLYING THE FUMIGANT IN 2 SEPARATE SETS PREVENTED THE WORKERS FROM ADEQUATELY APPLYING A WATER SEAL ON THE FIELD.
2003	1215	Probable	Eye	BURNING EYES.	33-RIV-03. SEE 2003-1207.
2003	1216	Probable	Eye, Systemic	BURNING EYES, NAUSEA.	33-RIV-03. SEE 2003-1207.
2003	1218	Probable	Eye, Respiratory	IRRITATED EYES, NOSE AND THROAT, DIFFICULTY BREATHING.	33-RIV-03. SEE 2003-1207.
2003	1219	Probable	Eye, Respiratory	IRRITATED EYES, NOSE AND THROAT.	33-RIV-03. SEE 2003-1207.
2003	1220	Probable	Eye, Respiratory	IRRITATED EYES, NOSE AND THROAT.	33-RIV-03. SEE 2003-1207.
2003	1221	Probable	Eye, Respiratory	COUGHING, DIFFICULTY BREATHING, WATERY AND BURNING EYES, IRRITATED NOSE AND THROAT.	33-RIV-03. SEE 2003-1207. THIS YOUNG MAN DEVELOPED SYMPTOMS IN THE BACK SEAT OF THE FAMILY TRUCK WITH THE AIR CONDITIONER RUNNING. HE SAID HIS PARENTS WERE SIMILARLY AFFECTED, BUT DID NOT IDENTIFY THEM FURTHER.
2003	1222	Probable	Eye, Respiratory	IRRITATED EYES, NOSE AND THROAT, DIFFICULTY BREATHING.	33-RIV-03. SEE 2003-1207.
2003	1224	Probable	Eye, Respiratory	IRRITATED EYES, NOSE AND THROAT, BREATHING DIFFICULTY.	33-RIV-03. SEE 2003-1207. A SINGLE QUESTIONNAIRE REPORTED THE EXPERIENCE OF THIS FAMILY (2003-1224 - 1228). THEIR SYMPTOMS BEGAN ABOUT 9 PM, AND THEY LEFT THEIR HOUSE ABOUT 11:30. THE SAME SYMPTOMS ARE IMPUTED TO EACH FAMILY MEMBER.
2003	1225	Probable	Eye, Respiratory	IRRITATED EYES, NOSE AND THROAT, BREATHING	33-RIV-03. SEE 2003-1207.

				DIFFICULTY.	
2003	1226	Probable	Eye, Respiratory	IRRITATED EYES, NOSE AND THROAT, BREATHING DIFFICULTY.	33-RIV-03. SEE 2003-1207.
2003	1227	Probable	Eye, Respiratory	IRRITATED EYES, NOSE AND THROAT, BREATHING DIFFICULTY.	33-RIV-03. SEE 2003-1207.
2003	1228	Probable	Eye, Respiratory	IRRITATED EYES, NOSE AND THROAT, BREATHING DIFFICULTY.	33-RIV-03. SEE 2003-1207.
2003	1229	Probable	Eye, Respiratory	IRRITATED EYES, NOSE AND THROAT, BREATHING DIFFICULTY.	33-RIV-03. SEE 2003-1207. THIS VICTIM'S QUESTIONNAIRE INDICATES THAT "KIDS" WERE TAKEN THE FOLLOWING MORNING TO SEE A DR. TONY WONG. THE CHILDREN ARE NOT IDENTIFIED OR MENTIONED IN ANY OTHER WAY.
2003	1237	Probable	Eye	SLIGHT BURNING EYES.	40-FRE-03. SEE 2003-1005. WHILE PATROLLING THE AQUEDUCT, A SECURITY OFFICER SMELLED A CHEMICAL ODOR. HER EYES BURNED WHEN SHE LEFT THE CAR TO CHECK THE GATES NEAR THE CRASH SITE. SHE FELT FINE WHEN SHE LEFT THE AREA, SO SHE DID NOT SEE A DOCTOR.
2004	122	Definite	Skin	ITCHY, PAINFUL AND SWOLLEN RASH ON THE ARMS, HANDS AND FACE.	A CHEMICAL ASSISTANT OPERATOR ATTRIBUTED A RASH TO FUME CONTACT WHILE TRANSFERRING METAM-SODIUM INTO A DRUM. HE TOLD HIS SUPERVISOR SIX DAYS LATER, AND WAS SENT FOR CARE. HE WORKED LIGHT DUTY FOR TWO AND A HALF MONTHS WHILE THE DOCTOR MONITORED PROGRESS.
2004	193	Probable	Skin	BURNING AND ITCHING RASH ON THE LEGS, ABDOMEN AND GROIN.	A WORKER WORE ALL REQUIRED PPE, BUT DEVELOPED A RASH AFTER REMOVING LINERS FROM 5,000-GALLON TANKS THAT HAD HELD METAM-SODIUM. HIS SUPERVISOR SUGGESTED THAT THE TANKS MAY NOT HAVE BEEN CLEANED AFTER USE AS THOROUGHLY AS THEY USUALLY WERE.
2004	375	Possible	Systemic	NAUSEA, UPSET STOMACH WEAKNESS, CHEST PAIN.	A FIELD WORKER ATE HIS LUNCH AT THE EDGE OF A FIELD TREATED WITH METAM-SODIUM THE DAY BEFORE. HE DEVELOPED SYMPTOMS AND HIS FOREMAN TOOK HIM FOR MEDICAL CARE. HE MOVED DRIP TAPE IN AN ADJACENT FIELD IN PREPATION FOR A METAM-SODIUM APPLICATION.
2004	717	Possible	Skin	RASH ON THE ABDOMEN.	AFTER COMPLETING AN APPLICATION AND REMOVING HIS PROTECTIVE GEAR, A WORKER LEANED AGAINST HIS TRACTOR TO RETRIEVE A WRENCH THAT FELL FROM HIS POCKET. THE TRACTOR LOOKED DRY, BUT HE DEVELOPED A RASH SEVERAL DAYS LATER AT THE CONTACT SITE.
2004	1134	Definite	Skin	RED AND SWOLLEN SKIN WITH PAPULES ON THE HANDS AND FOREARMS.	A WORKER SUFFERED CHEMICAL BURNS ON HIS FOREARMS AND HANDS WHILE PERFORMING A POLE TREATMENTS. HE REPORTED GETTING THE LIQUID INSIDE HIS OVERSIZED WRIST-LENGTH

					GLOVES DURING THE APPLICATION. HE WAITED 5 DAYS BEFORE SEEKING MEDICAL ATTENTION.
2005	357	Probable	Respiratory, Systemic	BURNING NOSE, DIFFICULTY BREATHING, NAUSEA, FAINTNESS, VOMITING, ABDOMINAL PAIN.	A FUMIGANT LEAKED FROM A UTILITY POLE UNDER TREATMENT. THE WIND BLEW THE FUMIGANT FUMES INTO THE APPLICATOR'S FACE. HE HAD LEFT THE POSITION AND COULD NOT BE CONTACTED FOR INTERVIEW, BUT HAD LEFT A WRITTEN DESCRIPTION OF THE INCIDENT WITH THE EMPLOYER.
2005	399	Probable	Skin	ITCHY, HARD, CRUSTED, AND SCALY IRREGULARLY SHAPED RED PATCHES ON THE EXPOSED SKIN OF THE FACE AND ARMS.	A WORKER REPORTED REPEATED SKIN ERUPTIONS WHILE WORKING FOR A COMPANY THAT APPLIES PROTECTIVE CHEMICALS TO UTILITY POLES. THE INVESTIGATOR COULD NOT LOCATE HIM FOR AN INTERVIEW.
2005	414	Probable	Eye	EYE IRRITATION.	A WORKER DROVE PAST A PRE-PLANT SPRINKLER CHEMIGATION TO DELIVER WATER FOR AN APPLICATION TO WALNUTS. THE GUARD HAD FALLEN OFF FROM A SPRINKLER HEAD, WHICH ALLOWED THE SPRINKLER TO SPRAY HIM IN THE FACE. HE USED HIS EYEWASH BEFORE BEING TAKEN FOR CARE.
2005	433	Probable	Skin, Eye, Systemic	NUMB AND DRY LIPS, ITCHY SKIN, BURNING AND TEARING EYES, NAUSEA.	26-KER-05. SEE 2005-433. A GROWER APPLIED METAM-SODIUM THROUGH A SPRINKLER SYSTEM TO A PRE-PLANT CARROT FIELD OVER A 3-DAY PERIOD. OVER THE NEXT 2 DAYS, THE ODOR DRIFTED INTO NEARBY VINEYARDS. SEE 2005-433 TO 439, 552, 691 - 724, 799 - 801, 1267, 1268.
2005	434	Probable	Eye, Respiratory, Systemic	HEADACHE, BURNING IN THE STOMACH, NAUSEA, VOMITING, BURNING AND TEARING EYES, SORE THROAT.	26-KER-05. SEE 2005-433. APPROXIMATELY 1,000 WORKERS PICKED GRAPES IN THE AREA DURING THIS TIME. OF THE 45 WORKERS INTERVIEWED OR WHO SUBMITTED QUESTIONNAIRES, 41 REPORTED SYMPTOMS.
2005	435	Probable	Respiratory, Systemic	NAUSEA, VOMITING, DIZZINESS, HEADACHE, CHILLS, SORE THROAT.	26-KER-05. SEE 2005-433. THE CAC CITED THE GROWER FOR NUMEROUS VIOLATIONS RELATED TO THE METAM SODIUM APPLICATION. THE CAC ALSO CITED THE GROWER AND A LABOR CONTRACTOR FOR NOT IMMEDIATELY TRANSPORTING ILL WORKERS TO A MEDICAL FACILITY.
2005	436	Probable	Skin, Eye, Respiratory, Systemic	WATERY AND BURNING EYES, HEADACHE, NAUSEA, VOMITING, FACIAL NUMBNESS, DIZZINESS, WEAKNESS, THROAT/RESPIRATORY IRRITATION.	26-KER-05. SEE 2005-433. DUE TO THE LARGE NUMBER OF WORKERS IN THE AREA, IT IS LIKELY THAT QUITE A FEW MORE WORKERS SUFFERED SYMPTOMS, BUT FAILED TO NOTIFY THEIR SUPERVISOR ABOUT THEIR SYMPTOMS.
2005	437	Probable	Eye, Respiratory, Systemic	NAUSEA, VOMITING, DIZZINESS, CHILLS, BURNING EYES, SORE THROAT, HEADACHE. THE SYMPTOMS LASTED 2 DAYS. SINCE THEN, SHE LOST HER APPETITE AND HAS AN UPSET STOMACH.	26-KER-05. SEE 2005-433.

2005	438	Probable	Eye, Respiratory, Systemic	NECK PAIN, VOMITING, HEADACHE, WEAKNESS, BURNING THROAT, TEARING AND BURNING EYES, DIFFICULTY BREATHING.	26-KER-05. SEE 2005-433. EMERGENCY MEDICAL TECHNICIANS DECONTAMINATED SEVERAL WORKERS, INCLUDING THIS ONE, BEFORE TRANSPORTING THEM TO A HOSPITAL. SHE ALSO WENT FOR FOLLOW-UP MEDICAL CARE 2 DAYS LATER.
2005	439	Probable	Eye, Respiratory, Systemic	HEADACHE, BURNING AND TEARING EYES, NUMBNESS OF THE TONGUE AND LIPS, VOMITING, NAUSEA, DIZZINESS, ABDOMINAL PAIN, DRY AND SORE THROAT.	26-KER-05. SEE 2005-433. THIS WORKER STATED SHE HAS ALLERGIES TO DUST AND THAT SHE HAD A PREVIOUS EPISODE WITH SIMILAR SYMPTOMS IN 2004.
2005	552	Probable	Eye, Respiratory, Systemic	SORE THROAT, COUGH, PAIN IN THE CHEST AND BACK, UPSET STOMACH, VOMITING, NAUSEA, FEVER, RED AND IRRITATED EYES, WHEEZING, RESPIRATORY DIFFICULTY. SHE SUBSEQUENTLY DEVELOPED LOBAR PNEUMONIA AND WAS HOSPITALIZED.	26-KER-05. SEE 2005-433. THIS FIELDWORKER SOUGHT MEDICAL CARE TWO DAYS AFTER EXPOSURE. SHE WAS FOUND TO HAVE PNEUMONIA, WHICH PROVED TO BE VALLEY FEVER. THE ORGANISM MUST HAVE BEEN PRESENT BEFORE EXPOSURE, BUT EXPOSURE MAY HAVE HELPED IT TAKE HOLD.
2005	691	Probable	Eye, Respiratory, Systemic	BURNING AND TEARING EYES, NASAL AND THROAT IRRITATION, ABDOMINAL PAIN, NAUSEA, HEADACHE, VOMITING, DIZZINESS.	26-KER-05.SEE 2005-433. ON THE QUESTIONNAIRE, THIS WORKER INDICATED SHE SAW A DOCTOR WHO TOLD HER SHE HAD BRONCHITIS.
2005	692	Probable	Eye, Systemic	HEADACHE, BURNING EYES, NAUSEA, DIZZINESS.	26-KER-05. SEE 2005-433. IN THIS WORKERS' QUESTIONNAIRE, HE DOES NOT MENTION WHETHER HE SMELLED AN ODOR OR NOT.
2005	693	Probable	Eye, Respiratory, Systemic	HEADACHE, STOMACH ACHE, SORE THROAT, IRRITATED AND WATERING EYES, NASAL IRRITATION, NAUSEA, VOMITING, DIZZINESS.	26-KER-05. SEE 2005-433.
2005	694	Probable	Skin, Eye, Respiratory, Systemic	NAUSEA, BURNING AND TEARING EYES, ITCHY SKIN, SORE THROAT	26-KER-05. SEE 2005-433.
2005	695	Probable	Eye, Respiratory, Systemic	CHILLS, VOMITING, TONGUE NUMBNESS, BURNING EYES, SNEEZING, SORE THROAT.	26-KER-05. SEE 2005-433. IN THIS WORKERS' QUESTIONNAIRE, HE DOES NOT MENTION WHETHER HE SMELLED AN ODOR OR NOT.
2005	696	Probable	Skin, Eye, Respiratory, Systemic	BURNING EYES, DIZZINESS, NAUSEA, HEADACHE, UNSPECIFIED RESPIRATORY SYMPTOMS, BURNING SKIN, ABDOMINAL PAIN.	26-KER-05. SEE 2005-433. ACCORDING TO THE QUESTIONNAIRE, HER SYMPTOMS RESOLVED WHEN SHE LEFT THE FIELD.
2005	697	Probable	Skin, Eye,	HEADACHE, SORE THROAT,	26-KER-05. SEE 2005-433. ACCORDING TO THE QUESTIONNAIRE,

			Respiratory, Systemic	TEARING EYES, NAUSEA, ITCHINESS, RASH ON THE NECK, COUGHING, SNEEZING, DIFFICULTY BREATHING	THIS WORKER NOTED THAT HER SYMPTOMS RESOLVED DAYS AFTER SHE LEFT THE VINEYARD.
2005	698	Probable	Skin, Eye, Respiratory, Systemic	BURNING, TEARING AND ITCHY EYES, HEADACHE, SORE THROAT, DIFFICULTY BREATHING, ITCHY NOSE, SNEEZING, ITCHY RASH, NAUSEA AND/OR VOMITING (NOT SPECIFIED WHICH).	26-KER-05. SEE 2005-433. THIS WORKER STATED HIS SYMPTOMS DID NOT RESOLVE UNTIL DAYS LATER.
2005	699	Probable	Respiratory, Systemic	NAUSEA AND/OR VOMITING (UNSPECIFIED WHICH ONES), HEADACHE, UNSPECIFIED RESPIRATORY SYMPTOMS.	26-KER-05. SEE 2005-433.
2005	700	Probable	Eye, Respiratory, Systemic	SORE THROAT, DIFFICULTY BREATHING, BODY SHAKES, DISORIENTATION, ANXIETY, VOMITING, TEARING EYES.	26-KER-05. SEE 2005-433. THIS WORKER REPORTED THAT HE FELT "OUT OF SORTS" FOR SEVERAL DAYS AFTERWARDS.
2005	701	Probable	Eye, Respiratory, Systemic	HEADACHE, VOMITING, TEARY EYES, SORE THROAT, NAUSEA.	26-KER-05. SEE 2005-433. THIS WORKER STATED HER SYMPTOMS HAD NOT RESOLVED WHEN SHE FILLED OUT THE QUESTIONNAIRE.
2005	702	Probable	Eye, Respiratory, Systemic	HEADACHE, ABDOMINAL PAIN, UNSPECIFIED EYE SYMPTOMS, UNSPECIFIED RESPIRATORY SYMPTOMS.	26-KER-05. SEE 2005-433. THIS WORKER REPORTED THAT HIS SYMPTOMS RESOLVED BY 5 PM THAT DAY.
2005	703	Probable	Eye, Respiratory, Systemic	HEADACHE, ABDOMINAL PAIN, UNSPECIFIED EYE SYMPTOMS, UNSPECIFIED RESPIRATORY SYMPTOMS.	26-KER-05. SEE 2005-433. THIS WORKER STATED HER SYMPTOMS RESOLVED LATE THAT AFTERNOON.
2005	704	Probable	Skin, Eye, Respiratory, Systemic	HEADACHE, UNSPECIFIED EYE SYMPTOMS, UNSPECIFIED SKIN SYMPTOMS, UNSPECIFIED RESPIRATORY SYMPTOMS.	26-KER-05. SEE 2005-433. THIS WORKER SPECIFIED HIS SYMPTOMS RESOLVED LATE THAT AFTERNOON.
2005	705	Probable	Eye, Respiratory, Systemic	SNEEZING, RUNNY NOSE, SORE THROAT, TEARING EYES, NAUSEA, HEADACHE, ABDOMINAL PAIN, BURNING IN THE NOSE AND MOUTH.	26-KER-05. SEE 2005-433. THIS WORKER DID NOT SPECIFY IN HER QUESTIONNAIRE WHETHER OR NOT SHE SMELLED AN ODOR. SHE MENTIONED SUFFERING A HEADACHE AND NAUSEA FOR SEVERAL DAYS AFTERWARDS.
2005	706	Probable	Eye, Systemic	TEARING EYES, HEADACHE.	26-KER-05. SEE 2005-433. THIS WORKER SPECIFIED ON HER QUESTIONNAIRE THAT HER SYMPTOMS RESOLVED AFTER SHE LEFT THE FIELD.
2005	707	Probable	Eye, Systemic	TEARING EYES, HEADACHE.	26-KER-05. SEE 2005-433. THIS WORKER SPECIFIED ON HIS

					QUESTIONNAIRE THAT HIS SYMPTOMS RESOLVED AFTER HE LEFT THE FIELD.
2005	708	Probable	Eye, Respiratory, Systemic	HEADACHE, NAUSEA, ABDOMINAL PAIN, VOMITING, SORE THROAT, LIGHTHEADEDNESS, DIZZINESS, UNSPECIFIED EYE SYMPTOMS, DIARRHEA, DIFFICULTY BREATHING.	26-KER-05. SEE 2005-433.
2005	709	Probable	Eye, Respiratory, Systemic	SORE THROAT, DIFFICULTY BREATHING, ABDOMINAL PAIN, HEADACHE, UNSPECIFIED EYE SYMPTOMS, DIARRHEA, NAUSEA AND/OR VOMITING (NOT SPECIFIED WHICH), LIGHTHEADEDNESS, DIZZINESS.	26-KER-05. SEE 2005-433.
2005	710	Probable	Eye, Respiratory, Systemic	HEADACHE, NAUSEA, LIGHTHEADEDNESS, DIZZINESS, ABDOMINAL PAIN, VOMITING, SORE THROAT, UNSPECIFIED EYE SYMPTOMS, DIFFICULTY BREATHING, DIARRHEA.	26-KER-05. SEE 2005-433.
2005	711	Possible	Skin	UNSPECIFIED SKIN SYMPTOMS.	26-KER-05. SEE 2005-433.
2005	712	Probable	Skin, Eye, Respiratory, Systemic	HEADACHE, BURNING EYES, LIGHTHEADEDNESS, DIZZINESS, UNSPECIFIED RESPIRATORY SYMPTOMS, RASH ON THE ARMS AND LEGS.	26-KER-05. SEE 2005-433.
2005	713	Probable	Eye, Respiratory, Systemic	VOMITING, DIZZINESS, SORE THROAT, BURNING EYES, LIGHTHEADEDNESS, FEVER, HEADACHE.	26-KER-05. SEE 2005-433. THIS WORKER SPECIFIED ON THE QUESTIONNAIRE THE SYMPTOMS RESOLVED AFTER LEAVING THE FIELD.
2005	714	Probable	Skin, Respiratory, Systemic	HEADACHE, ABDOMINAL PAIN, DIFFICULTY BREATHING, BURNING SKIN.	26-KER-05. SEE 2005-433. THIS WORKER DID NOT MENTION ON HER QUESTIONNAIRE WHETHER OR NOT SHE SMELLED AN ODOR. SHE SPECIFIED THAT HER SYMPTOMS RESOLVED AFTER SHE LEFT THE FIELD.
2005	715	Probable	Eye, Systemic	SLIGHT HEADACHE, NAUSEA, WEAKNESS, BURNING EYES, ABDOMINAL PAIN.	26-KER-05. SEE 2005-433. THIS WORKER SPECIFIED IN HER QUESTIONNAIRE THAT HER SYMPTOMS RESOLVED AFTER SHE LEFT THE FIELD.
2005	716	Probable	Eye, Respiratory, Systemic	COUGHING, SNEEZING, HEADACHE, BURNING EYES, NAUSEA.	26-KER-05. SEE 2005-433. THIS WORKER SPECIFIED ON HER QUESTIONNAIRE THAT HER SYMPTOMS RESOLVED AFTER SHE LEFT THE FIELD.

2005	717	Probable	Eye, Respiratory, Systemic	HEADACHE, DIZZINESS, NAUSEA, TEARING EYES, DIFFICULTY BREATHING, ABDOMINAL PAIN.	26-KER-05. SEE 2005-433. THIS WORKER DID NOT MENTION ON HIS QUESTIONNAIRE WHETHER OR NOT HE SMELLED AN ODOR. HE SPECIFIED HE STILL HAD SYMPTOMS, BUT TO A LESSER DEGREE WHEN HE FILLED OUT THE QUESTIONNAIRE.
2005	718	Probable	Eye, Respiratory, Systemic	HEADACHE, NAUSEA, ABDOMINAL PAIN, BURNING EYES, UNSPECIFIED RESPIRATORY SYMPTOMS.	26-KER-05. SEE 2005-433. THIS WORKER SPECIFIED IN HIS QUESTIONNAIRE THAT HIS SYMPTOMS RESOLVED AFTER HE LEFT THE FIELD.
2005	722	Possible	Skin, Systemic	HEADACHE, BURNING AROUND THE MOUTH AREA, TIREDNESS, LIGHTHEADEDNESS.	26-KER-05. SEE 2005-433. THIS WORKER DID NOT MENTION ON HER QUESTIONNAIRE WHETHER OR NOT SHE SMELLED AN ODOR. SHE SPECIFIED THAT SHE FELT TIRED AND LIGHTHEADED AFTER SHE LEFT THE FIELD.
2005	723	Probable	Eye	UNSPECIFIED EYE SYMPTOMS.	26-KER-05. SEE 2005-433. THIS WORKER DID NOT SPECIFY ON THE QUESTIONNAIRE WHETHER OR NOT HE SMELLED AN ODOR. HE INDICATED HE DID NOT FEEL ILL ON AUGUST 6, BUT CHECKED YES FOR EYE SYMPTOMS.
2005	724	Probable	Eye, Respiratory, Systemic	BURNING EYES, TONGUE NUMBNESS, NAUSEA, HEADACHE, UNSPECIFIED RESPIRATORY SYMPTOMS.	26-KER-05. SEE 2005-433. THIS WORKER DID NOT SPECIFY ON HIS QUESTIONNAIRE WHETHER OR NOT HE SMELLED AN ODOR. HIS INDICATED THAT HIS SYMPTOMS RESOLVED LATE THAT AFTERNOON.
2005	799	Probable	Eye	BURNING EYES.	26-KER-05. SEE 2005-433. THIS LABOR SUPERVISOR SMELLED AND ODOR AND NOTED HIS EYES BURNING WHILE OUT SUPERVISING THE FIELD CREWS IN THE VICINITY OF THE METAM-SODIUM APPLICATION. HE MOVED SOME CREWS FARTHER AWAY FROM THE APPLICATION AND SENT SOME HOME.
2005	800	Probable	Eye	STINGING AND WATERY EYES.	26-KER-05. SEE 2005-433. THIS HUMAN RESOURCES DEPARTMENT EMPLOYEE STATED HE NOTICED AN ODOR AND FELT HIS EYES STINGING AND WATERING WHILE GETTING IN AND OUT OF HIS TRUCK AROUND THE VINEYARDS. HE STATED HIS SYMPTOMS RESOLVED AS SOON AS HE LEFT THE FIELD.
2005	801	Probable	Eye	SLIGHTLY RED AND IRRITATED EYES.	26-KER-05. SEE 2005-433. THIS CREW SUPERVISOR NOTICED A STRONG ODOR THAT IRRITATED HIS EYES. HE STATED ONLY ONE EMPLOYEE (2005-552) INFORMED HIM SHE FELT SICK. HE STATED HIS SYMPTOMS RESOLVED WHEN HE LEFT THE AREA.

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by Louise Mehler

Worker Health and Safety Branch

Department of Pesticide Regulation