SUGGESTED PERMIT CONDITIONS

METHYL BROMIDE COMMODITY FUMIGATION

August 8, 1994

STATE OF CALIFORNIA
Environmental Protection Agency
Department of Pesticide Regulation
1020 N Street, Sacramento, California 95814

SUGGESTED PERMIT CONDITIONS

Methyl Bromide
Commodity Fumigation

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INTRODUCTION

Intent

These permit conditions are meant to be guidelines for typical fumigations. Because of the wide variety of fumigation types, some of the permit conditions may be inappropriate for certain applications. In such cases, the County Agricultural Commissioner may issue site specific permit conditions. The site specific permit conditions will consist of the requirements given here and/or alternative conditions based on information in the individual Work Site Plan. Methyl bromide users are encouraged to suggest alternatives in the Work Site Plan which will mitigate exposure. The County Agricultural Commissioner will evaluate requests for alternative conditions and consult with the Department of Pesticide Regulation to determine if the request will mitigate the exposure.

Major Concepts

The permit conditions are based on four concepts which methyl bromide users should keep in mind: **containment, dilution, distance** and **time**. First, high concentrations of methyl bromide should be contained. This means that fumigation equipment and the fumigation structure or enclosure should not leak. Second, when methyl bromide is not contained, dilute it with fresh air. Third, keep as much distance as possible between methyl bromide and people. Fourth, minimize the time people are exposed to methyl bromide. The permit conditions use the interaction of these four concepts to minimize exposure. For example, when one is not achieved, the other three are used to compensate.

While mitigation measures based on these concepts can decrease the methyl bromide exposure to the desired levels, the best way to decrease exposure is to use as little methyl bromide as possible. Particularly, when better containment is provided, it may be possible to decrease the amount of methyl bromide and still achieve efficacy. Users will find that as less methyl bromide is used, the permit conditions become less obstructive and alternative conditions are easier to implement.

The permit conditions also require various approved test procedures to be used. The County Agricultural Commissioner has information on the equipment and procedures necessary to carry out these tests.

A: Enclosure — A single fumigated space.

Examples: a single chamber, single silo, single sea/land container, or a single group of bins under one tarpaulin.

B: Enclosed Area — A gas-confining area surrounded by non-porous walls and a roof.

C: Control Room — A small enclosed room adjoining some fumigation enclosures (e.g. primarily chambers) used exclusively for introducing methyl bromide into an enclosure and/or monitoring its concentration.

D: Fumiscope — A monitoring instrument which reads the concentration of methyl bromide in ounces per 1000.cubic feet inside an enclosure.

E: Loss Ratio — The proportion of methyl bromide per hour which leaks from the enclosure during the treatment period. This ratio is determined by a DPR-approved retention test.

F: Mechanical Ventilation — The use of fans or any mechanical device to ventilate a fumigation enclosure, or an enclosed area where fumigated commodities are stored.

G: Mitigation Measures — Modified work practices or engineering controls to comply with the stated permit conditions or alternative permit conditions.

H: Passive Ventilation — Non-mechanical ventilation (i.e. opening doors and removing tarpaulin cover) of a fumigation enclosure.

I: Secondary Enclosed Area — An **enclosed area** surrounding a fumigation enclosure. This is usually a structure (warehouse, production facility, etc.) that houses the fumigation enclosure. This does not include mesh screen or other porous barriers.

J: Work Site — A location where one or more enclosures are fumigated.

Example: several chambers or sea/land containers at one address.

K: Pressure Tested — Either a vacuum chamber or an enclosure which has been pressure tested following the procedures stated in the U.S. Department of Agriculture Plant Protection and Quarantine Treatment Manual.

L: Retention Tested — An enclosure that has been measured for loss of methyl bromide over time according to a DPR-approved procedure.

M: Untested — An enclosure that has not been pressure or retention tested.

N: Standard Height Exhaust Stack — An exhaust stack that is at least 10 feet above the enclosure's highest point, and at least 10 feet above any major obstruction within 200 feet of the stack, and at least as tall as the appropriate value in Table 1.

Examples of major obstructions: houses, mature orchards, silos

O: Exit Velocity — The air speed through the exhaust stack during aeration. The exit velocity is determined by dividing the rated fan capacity (cubic feet per minute) by the stack cross-sectional area (square feet).

P: Minimum Exhaust Stack — An exhaust stack that does not meet the conditions for a standard height exhaust stack, but is at least 15 feet above the ground and has an exit velocity of at least 600 feet per minute.

Q: No Stack — An enclosure whose stack does not meet either the standard height or minimum qualifications, or which does not use a stack for aeration.

R: Treatment Zone — A buffer zone that is maintained around an enclosure during the fumigation treatment period (exposure or holding period). Only persons supervising and performing fumigation activities are permitted in the treatment zone. All other people including residents and workers must be excluded from this zone.

S: Aeration Zone — A buffer zone that is maintained around an enclosure during the first portion of the aeration period (4 hours or less depending on the emission concentration). Only persons supervising and performing fumigation activities are permitted in the aeration zone. All other people including residents and workers must be excluded from this zone.

1: Maximum Application Rate

A maximum application rate of 8 pounds per 1000 cubic feet or the rate specified by the label may be used, whichever is less.

2: Total Methyl Bromide

The total amount of methyl bromide per work site must not exceed 1000 pounds in a 24-hour period.

3: Other Types of Applications

No other types of methyl bromide applications (e.g. field, greenhouse, potting soil, structural) can occur at the work site for the preceding 48 hours or the following 24 hours of a commodity application. Other commodity fumigations can be conducted.

4: Enclosed Area and Common Walls

The following types of fumigations are prohibited unless mitigation options are identified in the Work Site Plan:

- those inside an enclosed area with people present
- enclosures which share a common wall with another enclosed area with people present

Examples: A tarpaulin fumigation inside a warehouse is prohibited. Using a chamber which shares a common wall with an office is prohibited.

5: Outside Introduction

Application from outside the enclosure through a closed system is required. Releasing methyl bromide from inside the enclosure is prohibited unless mitigation options are identified in the Work Site Plan.

6: Gas-tight Fumigant Lines

All fumigant lines must be gas-tight. Fumigant lines, valves, fittings, etc. which are routinely adjusted or changed must be checked for leaks after each adjustment.

Examples: When changing methyl bromide cylinders, the connection between the introduction line and the cylinder must be checked for leaks. The cylinder valve must be checked for leaks after opening.

7: Test Equipment Seals

The enclosure must be sealed where instrument sampling lines pass through enclosure walls.

Example: Fumiscope leads must be placed and the hole at the chamber or enclosure wall sealed prior to the fumigation.

8: Test Equipment Exhaust

Exhaust from sampling equipment must be vented away from people and to outside air or back into the enclosure.

9: Fumigant Line Purge

When introducing methyl bromide from an enclosed control room, applicators must use nitrogen gas or compressed air to purge fumigant lines prior to changing cylinders.

10: Control Room Ventilation

Enclosed control rooms must be mechanically ventilated during fumigation if workers are present.

11: Control Room Storage

Methyl bromide cylinders must not be stored inside enclosed control rooms.

NOTE: The following conditions pertain to aeration of the fumigation enclosure, not aeration of areas where commodities are stored, except when they are the same.

12: Aeration Initiation

Persons who initiate aeration by manually breaking a seal must wear a self-contained breathing apparatus (SCBA). Exception: enclosures for which aeration is initiated remotely, such as chambers.

Examples: breaking seals on tarpaulin fumigations, opening sea/land container doors

13: Aeration During Daylight

Aeration must be initiated during daylight hours. Exception: Enclosures which aerate using an exhaust stack meeting the standard height requirements may exhaust at any time.

14: Minimum Aeration Times

Enclosures must be aerated for the following minimum duration:

a. 4 hours if mechanically ventilated using fans, or
b. 12 hours if passively ventilated

NOTE: The duration of the aeration period should not be confused with the time the aeration zone is in place. The aeration zone is in place for only the first portion of the aeration: four hours at most.

15: Testing Aeration Completeness

The concentration of methyl bromide in the air spaces between the stacked commodity must be less than 5 ppm before the commodity can be moved from the enclosure. Testing of this air space must be done according to approved procedures.

16: Enclosed Storage Areas

Methyl bromide concentrations in enclosed areas (i.e. buildings, warehouses, silos, etc.) where fumigated commodities are stored must be less than 5 ppm before persons may enter. Testing of the air concentration must be done according to approved procedures. No individual may be inside the enclosed area for more than one hour in a 24-hour period.

NOTE: This condition pertains to areas where commodities are stored, not the fumigation enclosure, except when they are the same.

17: Work Site Plan

The enclosure operator and/or pest control business must complete or revise a Work Site Plan before receiving a permit. A completed Work Site Plan must be submitted to the County Agricultural Commissioner for evaluation before a Restricted Materials Permit will be issued.

18: Test Results Documentation

The enclosure operator must keep records of all test results for 2 years and make them available to the County Agricultural Commissioner and workers (pursuant to Labor Code Section 6408 and Cal-OSHA regulations Title 8, Section 3204) upon request.

Fumigation Enclosure Types

There are specific conditions for each of six different types of fumigation enclosures. The enclosures are classified by the combination of two factors: the amount of methyl bromide the enclosure retains and the method used to aerate. There are two retention categories: pressure tested and retention tested/untested; and three aeration methods: standard height stack, minimum stack, and no stack. These two retention categories and three aeration categories give the six possible combinations of fumigation enclosures listed below:

A1 - Pressure Tested/Standard Height Stack (e.g. quarantine or vacuum chamber)

A2 - Pressure Tested/Minimum Stack (e.g. quarantine or vacuum chamber)

A3 - Pressure Tested/No Stack (e.g. quarantine chamber without a stack)

B1 - Retention Tested or Untested/Standard Height Stack (e.g. typical chamber)

B2 - Retention Tested or Untested/Minimum Stack (e.g. "Butler" with short stack)

B3 - Retention Tested or Untested/No Stack (e.g. tarp fumigation)

Buffer Zones

The amount of time a person spends in areas around commodity fumigations must be limited in order to minimize exposure. Exposure is limited by restricting a person's access to or time spent in areas near enclosures being fumigated or aerated. The size of the buffer zones depends on which of the six types of enclosures is being used. For certain types of enclosures, the amount of methyl bromide used and retained in the enclosure also influences the size of the buffer zone. There are two types of buffer zones: treatment zone and aeration zone. There can be different sizes of treatment zones because of differences in exposure duration. For example, nearby workers would have a smaller treatment zone if they worked for 12 hours, compared to nearby residents who would have a treatment zone based on a 24 hour exposure. A summary of the treatment zones and aeration zones for the various types of fumigations appears in Chart 1.

Enclosure Description

A pressure tested/standard height enclosure is a vacuum chamber or has passed the USDA pressure test. The exhaust stack is at least 10 feet above the enclosure's highest point, at least 10 feet above any major obstruction within 200 feet of the stack and at least as tall as the appropriate value listed in Table 1.

Examples: a quarantine chamber with a tall stack; a vacuum chamber with a tall stack.

19: Treatment Zone

A treatment zone of 10 feet must be established around the enclosure during the fumigation treatment period. Only persons supervising and performing fumigation activities are permitted in the treatment zone during the treatment period. Exception: Limited transit is allowed if unavoidable.

20: Aeration Zone

An aeration zone of 10 feet must be maintained around an enclosure during the first portion of the aeration period. Only persons supervising and performing fumigation activities are permitted in the aeration zone. Exception: Transit along public thoroughfares is allowed. The aeration zone must remain in place for the first four hours of aeration or until the exhaust concentration is less than 5 ppm. The aeration period itself may be of longer duration. Testing must be done according to approved procedures.

21: Vertical Stack Exhaust

The stack must be vented vertically to the outside air. When exhausting, the top of the stack must be free of overhead obstructions.

22: Aeration During Daylight

Does not apply. Aeration may occur at any time.

Enclosure Description

A pressure tested/minimum stack enclosure is a vacuum chamber or has passed the USDA pressure test. The exhaust stack is at least 15 feet above ground and the exhaust exit velocity is at least 600 feet per minute.

Examples: a quarantine chamber with a short stack; a vacuum chamber with a short stack.

19: Treatment Zone

A treatment zone of 10 feet must be established around the enclosure during the fumigation treatment period. Only persons supervising and performing fumigation activities are permitted in the treatment zone during the treatment period. Exception: Limited transit is allowed if unavoidable.

20: Aeration Zone

An aeration zone as specified in Table 3, page 19 must be maintained around an enclosure during the first portion of the aeration period. Only persons supervising and performing fumigation activities are permitted in the aeration zone. Exception: Transit along public thoroughfares is allowed. The aeration zone must remain in place for the first four hours of aeration or until the exhaust concentration is less than 5 ppm. The aeration period itself may be of longer duration. Testing must be done according to approved procedures.

21: Vertical Stack Exhaust

The stack must be vented vertically to the outside air. When exhausting, the top of the stack must be free of overhead obstructions.

22: Aeration During Daylight

Aeration must be initiated during daylight hours (see permit condition 13).

Enclosure Description

A pressure tested/no stack enclosure is a vacuum chamber or has passed the USDA pressure test, and either has no stack or the exhaust stack is less than 15 feet above ground or the exhaust exit velocity is less than 600 feet per minute.

Example: a quarantine chamber with no stack.

19: Treatment Zone

A treatment zone of 10 feet must be established around the enclosure during the fumigation treatment period. Only persons supervising and performing fumigation activities are permitted in the treatment zone during the treatment period. Exception: Limited transit is allowed if unavoidable.

20: Aeration Zone

An aeration zone as specified in Table 4, page 20 must be maintained around an enclosure during the first portion of the aeration period. Only persons supervising and performing fumigation activities are permitted in the aeration zone. Exception: Transit along public thoroughfares is allowed. The aeration zone must remain in place for the first four hours of aeration or until the exhaust concentration is less than 5 ppm. The aeration period itself may be of longer duration. Testing must be done according to approved procedures.

21: Vertical Stack Exhaust

Does not apply.

22: Aeration During Daylight

Aeration must be initiated during daylight hours (see permit condition 13).

Enclosure Description

A retention tested or untested/standard height stack enclosure may retain a large or small proportion of the methyl bromide and the exhaust stack is at least 10 feet above the enclosure's highest point, at least 10 feet above any building within 200 feet of the stack and at least as tall as the appropriate value listed in Table 1. **Note**: The size of the treatment zone may be minimized by measuring how well the enclosure retains methyl bromide and determining its loss ratio. This is done by performing a DPR-approved test procedure.

Examples: a typical chamber with a tall stack; a "Butler" tank with a tall stack; a building with a tall stack.

19: Treatment Zone

A treatment zone as specified in Table 2, page 18 must be established around the enclosure during the fumigation treatment period. Only persons supervising and performing fumigation activities are permitted in the treatment zone during the treatment period. Exception: Limited transit is allowed if unavoidable.

Different size zones may be calculated based on the duration of exposure and/or duration of the treatment period. For example, a treatment zone may be calculated for nearby workers based on a 12-hour work shift, and a separate treatment zone may be calculated for nearby residents based on 24-hour occupancy.

20: Aeration Zone

An aeration zone of 10 feet must be maintained around an enclosure during the first portion of the aeration period. Only persons supervising and performing fumigation activities are permitted in the aeration zone. Exception: Transit along public thoroughfares is allowed. The aeration zone must remain in place for the first four hours of aeration or until the exhaust concentration is less than 5 ppm. The aeration period itself may be of longer duration. Testing must be done according to approved procedures.

21: Vertical Stack Exhaust

The stack must be vented vertically to the outside air. When exhausting, the top of the stack must be free of overhead obstructions.

22: Aeration During Daylight

Does not apply. Aeration may occur at any time.

Enclosure Description

A retention tested or untested/minimum stack enclosure may retain a large or small proportion of the methyl bromide. The exhaust stack is at least 15 feet above ground and the exhaust exit velocity is at least 600 feet per minute. **Note**: The size of the treatment zone may be minimized by measuring how well the enclosure retains methyl bromide and determining its loss ratio. This is done by performing a DPR-approved test procedure.

Examples: a chamber with a short stack; a building exhausted through the roof.

19: Treatment Zone

A treatment zone as specified in Table 2, page 18 must be established around the enclosure during the fumigation treatment period. Only persons supervising and performing fumigation activities are permitted in the treatment zone during the treatment period. Exception: Limited transit is allowed if unavoidable.

Different size zones may be calculated based on the duration of exposure and/or duration of the treatment period. For example, a treatment zone may be calculated for nearby workers based on a 12-hour work shift, and a separate treatment zone may be calculated for nearby residents based on 24-hour occupancy.

20: Aeration Zone

An aeration zone as specified in Table 3, page 19 must be maintained around an enclosure during the first portion of the aeration period. Only persons supervising and performing fumigation activities are permitted in the aeration zone. Exception: Transit along public thoroughfares is allowed. The aeration zone must remain in place for the first four hours of aeration or until the exhaust concentration is less than 5 ppm. The aeration period itself may be of longer duration. Testing must be done according to approved procedures.

21: Vertical Stack Exhaust

The stack must be vented vertically to the outside air. When exhausting, the top of the stack must be free of overhead obstructions.

22: Aeration During Daylight

Aeration must be initiated during daylight hours (see permit condition 13).

Enclosure Description

A retention tested or untested/no stack enclosure may retain a large or small proportion of the methyl bromide and either has no stack or the exhaust stack is less than 15 feet above ground or the exhaust exit velocity is less than 600 feet per minute. **Note**: The size of the buffer zones may be minimized by measuring how well the enclosure retains methyl bromide and determining its loss ratio. This is done by performing a DPR-approved test procedure.

Examples: a typical sea/land container; a building exhausted through open doors and windows; a typical tarpaulin fumigation.

19: Treatment Zone

A treatment zone as specified in Table 2, page 18 must be established around the enclosure during the fumigation treatment period. Only persons supervising and performing fumigation activities are permitted in the treatment zone during the treatment period. Exception: Limited transit is allowed if unavoidable.

Different size zones may be calculated based on the duration of exposure and/or duration of the treatment period. For example, a treatment zone may be calculated for nearby workers based on a 12-hour work shift, and a separate treatment zone may be calculated for nearby residents based on 24-hour occupancy.

20: Aeration Zone

An aeration zone as specified in Table 4, page 20 must be maintained around an enclosure during the first portion of the aeration period. Only persons supervising and performing fumigation activities are permitted in the aeration zone. Exception: Transit along public thoroughfares is allowed. The aeration zone must remain in place for the first four hours of aeration or until the exhaust concentration is less than 5 ppm. The aeration period itself may be of longer duration. Testing must be done according to approved procedures.

21: Vertical Stack Exhaust

Does not apply.

22: Aeration During Daylight

Aeration must be initiated during daylight hours (see permit condition 13).

SUGGESTED PERMIT CONDITIONS

Methyl Bromide
Commodity Fumigation

CHART 1
Summary of Buffer Zone Sizes

Retention Category	Aeration Method	Class	Treatment Zone Size	Aeration Zone Size	Aerate Daylight Hours Only
Pressure Tested *(USDA pressure test)*	Standard Height Stack *(Table 1 requirements)**	A1	10 feet	10 feet	NO
	Minimum Stack *(stack 15 ft above ground & exit velocity >600 ft/min)*	A2	10 feet	Table 3	YES
	No Stack	A3	10 feet	Table 4	YES
Retention Tested or Untested *(DPR-approved test or no test)*	Standard Height Stack *(Table 1 requirements)**	B1	Table 2	10 feet	NO
	Minimum Stack *(stack 15 ft above ground & exit velocity >600 ft/min)*	B2	Table 2	Table 3	YES
	No Stack	B3	Table 2	Table 4	YES

* The stack must be at least 10 feet above the enclosure's highest point and at least 10 feet above any major obstruction within 200 feet of the stack and at least as tall as the appropriate value listed in Table 1.

TABLE 1
Standard Height Exhaust Stack

This table is used to determine the "standard height" (feet) of a stack. A "standard height" exhaust stack is one which is:

1. at least 10 feet above the enclosure's highest point, and
2. at least 10 feet above any major obstruction within 200 feet of the stack, and
3. at least as tall (above ground level) as the appropriate value in the table below

Total Amount of Methyl Bromide Applied (pounds) at the Work Site in a 24-hour Period ROUND UP

Exit Velocity (feet per minute)* ROUND DOWN	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000
600	21	23	26	28	30	32	34	37	39	41	43	45	48	50	52	54	57	59	61	63
700	19	21	23	25	28	30	32	34	36	39	41	43	45	47	50	52	54	56	58	61
800	16	18	21	23	25	27	30	32	34	36	38	41	43	45	47	49	52	54	56	58
900	15	16	18	20	23	25	27	29	31	34	36	38	40	43	45	47	49	51	54	56
1000	15	15	16	18	20	22	25	27	29	31	33	36	38	40	42	45	47	49	51	53
1100	15	15	15	16	18	20	22	24	27	29	31	33	35	38	40	42	44	46	49	51
1200	15	15	15	15	15	18	20	22	24	26	29	31	33	35	37	40	42	44	46	48
1300	15	15	15	15	15	15	17	19	22	24	26	28	31	33	35	37	39	42	44	46
1400	15	15	15	15	15	15	15	17	19	21	24	26	28	30	32	35	37	39	41	44
1500	15	15	15	15	15	15	15	15	17	19	21	23	26	28	30	32	34	37	39	41
1600	15	15	15	15	15	15	15	15	15	17	19	21	23	25	28	30	32	34	36	39
1700	15	15	15	15	15	15	15	15	15	15	16	19	21	23	25	27	30	32	34	36
1800	15	15	15	15	15	15	15	15	15	15	15	16	18	20	23	25	27	29	32	34
1900	15	15	15	15	15	15	15	15	15	15	15	15	16	18	20	22	25	27	29	31
2000	15	15	15	15	15	15	15	15	15	15	15	15	15	16	18	20	22	24	27	29
2100	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	18	20	22	24	26
2200	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	17	20	22	24
2300	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	17	19	21
2400	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	17	19
2500	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	17

$$\text{*Exit Velocity} = \frac{\text{Rated Fan Capacity (cubic feet per minute)}}{\text{Stack Cross-Sectional Area (square feet)}}$$

area of circle = 3.14 × radius^2

8/8/94

TABLE 2
Treatment Zone Sizes for
Retention Tested and Untested Enclosures

This table is used to determine the treatment zone size (feet) surrounding enclosures which are retention tested or untested. Consult with the County Agricultural Commissioner to determine the sizes for multiple fumigations in a 24-hour period.

Concentration Lost (pounds per 1000 cubic feet)* ROUND UP

Volume Fumigated in a 24-hour Period (cubic feet) ROUND UP	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0
1000	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
2000	30	30	30	30	30	30	30	30	30	35	40	45	50	55	60
3000	30	30	30	30	30	30	35	40	50	55	60	65	70	75	80
4000	30	30	30	30	30	40	50	55	65	70	80	85	90	95	100
6000	30	30	30	35	50	60	70	80	90	95	105	110	120	125	130
8000	30	30	30	50	65	80	90	100	110	120	125	135	140	150	155
10000	30	30	45	65	85	100	115	125	135	145	160	165	175	185	195
15000	30	30	60	80	100	120	130	145	160	170	180	190	200	210	220
20000	30	40	70	95	115	135	150	170	180	195	205	220	230	240	250
25000	30	45	80	105	130	150	170	185	200	215	230	240	255	265	275
30000	30	55	90	120	145	165	185	205	220	235	250	265	280	290	305
35000	30	60	100	130	160	180	200	225	240	255	275	290	300	315	330
40000	30	65	110	145	175	200	220	240	260	280	295	310	325	340	355
45000	30	75	120	155	185	210	235	260	280	295	315	335	350	365	380
50000	35	80	130	165	200	230	250	275	300	320	340	355	370	390	405
60000	40	95	145	185	225	255	285	310	335	355	380	400	420	440	455
70000	45	105	165	210	250	285	315	345	370	395	420	440	460	485	505
80000	50	115	180	225	270	305	340	375	400	425	455	480	500	525	545
90000	55	125	190	240	290	330	365	400	430	455	485	510	535	560	585
100000	60	135	205	260	310	355	390	430	460	490	525	550	575	605	625
110000	65	145	220	280	335	380	420	460	490	525	560	585	615	645	670
120000	70	155	235	295	350	400	440	485	520	555	590	620	650	680	705
130000	75	165	245	310	370	420	465	510	545	580	620	650	680	715	740
140000	80	175	260	325	390	440	485	535	570	610	650	680	715	745	775
150000	85	180	270	340	405	460	505	555	595	635	675	710	745	780	810
170000	90	195	295	370	435	495	545	600	640	685	730	765	800	840	870
190000	95	210	315	390	465	530	580	640	685	730	775	815	850	895	930
210000	100	225	330	415	490	560	615	675	725	770	820	860	900	945	980
230000	105	235	350	435	515	585	645	710	760	810	860	905	945	990	1030
250000	110	250	365	455	540	615	675	740	795	845	900	945	990	1035	1075

* The Concentration Lost is calculated from the application rate, exposure duration and loss ratio (proportion of methyl bromide leaked from the enclosure), according to the formula below. The exposure duration for workers is 12 hours or the treatment duration, whichever is less. The exposure duration for residents is the duration of treatment (24 hours maximum). The loss ratio is determined from a DPR-approved test; for untested enclosures use **0.030**.

Concentration Lost = [Application Rate (pounds per 1000 cubic feet)] × [Exposure Duration (hours)] × [Loss Ratio]

TABLE 3
Aeration Zone Sizes for Minimum Stacks

This table is used to determine the aeration zone size (feet) required **during the aeration** of enclosures with exhaust stacks having the following characteristics:

1. The top of the exhaust stack is at least 15 feet above ground level, and
2. The exit velocity is at least 600 feet per minute

$$\text{Exit Velocity} = \frac{\text{Rated Fan Capacity (cubic feet per minute)}}{\text{Stack Cross-Sectional Area (square feet)}}$$

Total Retained in a 24-hour Period (pounds)*	Aeration Zone (feet)
50	10
51	220
ROUND UP 100	220
150	360
200	490
250	610
300	720
350	820
400	920
450	1000
500	1090
550	1170
600	1250
650	1320
700	1390
750	1460
800	1530
850	1600
900	1670
950	1730
1000	1790

* The Total Retained is calculated from the amount of methyl bromide, treatment duration and loss ratio (proportion of methyl bromide leaked from the enclosure), according to the formulas below. The loss ratio is determined from a DPR-approved test.

Proportion Retained** = 1 – [Treatment Duration (hours) × Loss Ratio]

For untested enclosures, use **0.90 for the Proportion Retained

Total Retained = [Amount of Methyl Bromide Applied in a 24-hour Period (pounds)] × [Proportion Retained]

TABLE 4
Aeration Zone Sizes for No Stacks

This table is used to determine the aeration zone size (feet) of enclosures that have no stack. Consult with the county agricultural commissioner to determine the aeration zone size when aerating multiple enclosures in a 24-hour period.

Concentration Retained (pounds per 1000 cubic feet)* ROUND UP

Volume Aerated in a 24-hour Period (cubic feet) ROUND UP	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.4	4.8	5.2	5.6	6.0
1000	30	30	30	30	30	30	40	50	60	70	75	85	90	95	105
2000	30	30	30	40	60	75	90	100	115	125	135	145	155	160	170
3000	30	30	45	70	90	110	125	140	155	165	180	190	200	210	220
4000	30	30	65	95	115	135	155	170	185	200	215	225	240	250	260
6000	30	55	100	130	160	180	205	225	240	260	275	290	305	320	335
8000	35	80	125	165	195	220	245	265	290	305	325	345	360	375	390
10000	50	105	155	195	225	255	285	310	330	350	375	390	410	430	445
15000	65	140	200	250	290	330	360	395	420	450	475	500	525	545	565
20000	80	175	240	300	345	390	425	460	495	525	560	585	615	640	665
25000	95	200	275	340	390	440	480	520	560	595	630	660	695	725	750
30000	110	225	305	375	430	485	530	575	615	655	695	730	765	795	830
35000	125	245	335	410	470	525	575	625	670	710	750	790	830	865	900
40000	135	265	360	440	505	565	620	670	720	765	810	850	890	930	965
45000	145	285	385	470	540	600	660	715	765	815	860	905	945	990	1030
50000	160	305	410	495	570	635	700	755	810	860	910	955	1000	1045	1090
60000	180	340	455	550	630	705	770	835	895	950	1005	1060	1110	1155	1205
70000	200	370	495	600	685	765	840	910	975	1035	1095	1150	1205	1260	1315
80000	220	400	535	645	740	830	905	980	1050	1120	1180	1245	1305	1360	1420
90000	235	430	575	690	795	885	970	1050	1125	1195	1265	1330	1395	1460	1520
100000	255	460	615	735	845	945	1035	1120	1200	1275	1350	1420	1485	1555	1620
110000	270	490	650	780	895	1000	1095	1185	1270	1350	1425	1500	1575	1645	1710
120000	285	515	685	820	945	1050	1155	1245	1335	1420	1505	1580	1660	1730	1805
130000	300	545	720	865	990	1105	1210	1310	1400	1490	1575	1660	1740	1820	1895
140000	315	570	750	905	1035	1155	1265	1370	1465	1560	1650	1735	1820	1900	1980
150000	330	595	785	945	1080	1205	1320	1425	1530	1625	1720	1810	1895	1980	2065
170000	360	640	845	1015	1160	1295	1420	1535	1640	1745	1845	1940	2035	2125	2215
190000	385	685	905	1080	1240	1380	1510	1630	1745	1855	1960	2065	2165	2260	2355
210000	410	725	955	1140	1305	1450	1590	1715	1835	1950	2060	2165	2270	2370	2470
230000	430	760	995	1190	1360	1515	1655	1785	1910	2030	2140	2250	2355	2460	2560
250000	450	785	1030	1230	1405	1560	1705	1840	1965	2085	2200	2315	2420	2525	2625

* The Concentration Retained is calculated from the rate, treatment duration and loss ratio (proportion of methyl bromide leaked from the enclosure), according to the formulas below. The loss ratio is determined from a DPR-approved test.

Proportion Retained** = 1 – [Treatment Duration (hours) × Loss Ratio]

**For untested enclosures, use 0.90 for the Proportion Retained

Concentration Retained = [Application Rate (pounds per 1000 cubic feet)] × [Proportion Retained]

Description

This Work Site Plan has five sections:
Section A records general information about the work site.
Section B records compliance with general permit conditions.
Section C is used to determine the size of the buffer zones.
Section D records compliance with other specific conditions.
Section E records information for alternate conditions.

Instructions

The Work Site Plan must be completed and submitted to the County Agricultural Commissioner. The Work Site Plan is considered complete when all the questions in the appropriate sections are answered. After the completed Work Site Plan is evaluated by the Agricultural Commissioner, Restricted Materials Permits must be issued to both the facility operator and pest control business, if applicable.

A Restricted Materials Permit cannot be issued unless all questions in the appropriate sections are answered. Incorrect information on the Work Site Plan will result in denial of the permit.

Fumigation Site: _____

Address: _____ City: _____ Zip: _____

Contact Person: _____ Phone: _____
(Facility Operator, Grower, QAC Licensee, etc.)

Pest Control Business: _____ Permit Number: _____

Address: _____ City: _____ Zip: _____

Contact Person: _____ Phone: _____
(Facility Operator, Grower, QAC Licensee, etc.)

I VERIFY THAT THE FOLLOWING INFORMATION IS ACCURATE AND TRUE TO THE BEST OF MY KNOWLEDGE.

Signature:_____ Date:_____

Title:_____

If any of the questions in Section B are answered NO, mitigation measures or alternative conditions must be identified at the end of Section B. Consult with the County Agricultural Commissioner for suggestions on alternative conditions.

B.1: Maximum Application Rate	*(Condition 1)*. Will your application rate be 8 pounds per 1000 cubic feet or less? If question B.1 is answered NO, you must complete Section E.	YES	NO
B.2: Total Methyl Bromide	*(Condition 2)*. Will you be using 1000 pounds or less of methyl bromide at the work site during a 24 hour period? If question B.2 is answered NO, you must complete Section E.	YES	NO
B.3: Other Types of Applications	*(Condition 3)*. Can you insure that no other types of fumigations (e.g. field, greenhouse, potting soil, structural) will be done at the work site at the same time as a commodity fumigation?	YES	NO
B.4: Enclosed Areas	*(Condition 4)*. Is the fumigation enclosure outside of other buildings (i.e. not within a secondary enclosed area)?	YES	NO
B.5: Common Walls	*(Condition 4)*. Is the fumigation enclosure physically separated from all other structures (i.e. the fumigation enclosure does not share a common wall with another building)?	YES	NO

B.6: Outside Introduction	*(Condition 5)*. Is the methyl bromide introduced from outside the enclosure?	YES	NO
B.7: Gas-tight Fumigant Lines	*(Condition 6)*. Are fumigant lines and connections checked for leaks during each fumigation?	YES	NO

If concentrations within the enclosure are monitored with a Fumiscope or other instrument, are the following precautions taken?

B.8: Test Equipment Seals	*(Condition 7)*. Is the enclosure sealed where instrument sampling lines pass through enclosure walls?	YES	NO	does not apply
B.9: Test Equipment Exhaust	*(Condition 8)*. Is the exhaust from the monitoring instrument vented out of the control room or back into the enclosure?	YES	NO	does not apply

If methyl bromide is introduced from within an enclosed control room, are the following precautions taken?

B.10: Fumigant Line Purge	*(Condition 9)*. Is nitrogen gas or compressed air used to purge fumigant lines prior to changing cylinders?	YES	NO	does not apply
B.11: Control Room Ventilation	*(Condition 10)*. Is the control room mechanically ventilated when people are present?	YES	NO	does not apply
B.12: Control Room Storage	*(Condition 11)*. Are methyl bromide cylinders stored outside the control room?	YES	NO	does not apply

B.13: Aeration Initiation	*(Condition 12)*. is an SCBA worn when initiating aeration?	YES	NO	
B.14: Minimum Aeration Time	*(Condition 14)*. If the enclosure is aerated with mechanical ventilation, is the aeration period at least 4 hours?	YES	NO	does not apply
B.15: Minimum Aeration Time	*(Condition 14)*. If the enclosure is aerated passively, is the aeration period at least 12 hours?	YES	NO	does not apply
B.16: Testing Aeration Completeness	*(Condition 15)*. Is the air concentration checked according to approved procedures before moving the commodity from the enclosure?	YES	NO	does not apply

If the treated commodity is stored in an enclosed area, are the following precautions taken?

B.17: Storage Area Testing	*(Condition 16)*. Is the air concentration within the enclosed area checked according to DPR-approved procedures before people enter?	YES	NO	does not apply
B.18: Storage Area Work Schedule	*(Condition 16)*. Do workers spend less than 1 hour in a 24-hour period inside the enclosed storage area?	YES	NO	does not apply

B.19: Document Requirements *(Condition 18).* Are all test results kept for 2 years? YES NO does not apply

Alternate Conditions - Describe alternatives if any of the questions in Section B were answered NO.

The information in this section is used by the County Agricultural Commissioner to determine the size of the buffer zones for each enclosure at the work site. Complete this section for each enclosure, unless the answers to all of the questions for all enclosures are the same.

Retention Category Determination

C.1. Is the enclosure a vacuum chamber? YES NO

C.2. Does the enclosure pass the USDA pressure test? YES NO

C.3. Has the enclosure been retention tested according to DPR-approved procedures? YES NO

Aeration Category Determination

C.4. Does the enclosure use an exhaust stack for aeration? YES NO

If question C.4 is answered NO, go to question C.12.

C.5. What is the exhaust stack's height above ground level? Use lowest stack if more than 1. _____feet

C.6. Is the top of the exhaust stack at least 10 feet above the enclosure's highest point? YES NO

C.7. Is the top of the exhaust stack at least 10 feet above all major obstructions (building, silo, orchard) within 200 feet of the stack? YES NO

C.8. What is the rated fan capacity or air flow rate of the exhaust fan for this enclosure (combine all fans if more than one)? _____cubic feet per minute

C.9. What is the stack cross-sectional area for this enclosure (combine all stacks)? _____square feet
area of circle = $3.14 \times \text{radius}^2$

C.10. Divide the value from question C.8 by the value from question C.9. This is the exit velocity. _____feet per minute

C.11. What is the largest amount of methyl bromide that will be used for the entire work site in a 24-hour period? _____ pounds

Fumigation Information

C.12. What is the highest application rate that will be used for this enclosure? _____pounds per 1000 cubic feet

C.13. What is the maximum number of fumigations in a 24-hour period for this enclosure? _____

C.14. What is the fumigated volume for this enclosure? _____cubic feet

C.15. What is the maximum amount of methyl bromide used in a 24-hour period for this enclosure? _____pounds

C.16. What is the duration of the longest treatment period? _____ hours

C.17. If this enclosure has been retention tested according to a DPR-approved test, what is the loss ratio (proportion of methyl bromide leaked from the enclosure per hour)? _____ does not apply

Other Enclosures

C.18. Give the name, identification or designation for this enclosure _____

C.19. List any other enclosures that have the same answers to all of the questions in Section C. _____

_____

C.20. List any other enclosures that may be fumigated or aerated within the same 24-hour period and how many times they may be used. _____

_____

D: OTHER SPECIFIC CONDITIONS

Complete this section for each enclosure, unless all of the answers are the same.

D.1: Vertical Stack Exhaust	*(Condition 21).* If one or more stacks are used to aerate, are they vented vertically to the outside air?	YES	NO	does not apply
D.2: Unobstructed Exhaust	*(Condition 21).* If one or more stacks are used to aerate, are the tops of the stacks free of overhead obstructions during aeration?	YES	NO	does not apply
D.3: Daylight Aeration	*(Conditions 13 and 22).* Do you always initiate aeration during daylight hours?	YES	NO	

Alternate Conditions - Describe alternatives if any of the questions in Section D were answered NO. Attach additional pages if necessary.

E: ALTERNATE CONDITIONS

Complete this section only if alternate conditions need to be evaluated by the Department of Pesticide Regulation. Consult with the County Agricultural Commissioner before filling out this section. This section must be completed for each enclosure for which alternate conditions are being requested.

E.1. Enclosure Identification: _____

E.2. Description of Enclosure: _____
(chamber, tarped bins)

E.3. Enclosure Material (plastic tarp, wood): _____

E.4. Enclosure Dimensions: _____

E.5. Description of Secondary Enclosed Space (if any): _____

E.6. Secondary Enclosed Space Dimensions (if any): _____

E.7. Commodity Fumigated: _____

E.8. Months Fumigations Conducted (e.g. Jan-Dec): _____

E.9. Months of Peak Season (e.g. Jan-Dec): _____

E.10. Number of Fumigations Per Week During Peak Season: _____

E.11. Aeration Duration (hours or days): _____

E.12. Treated Commodity Storage Area Description: _____

E.13. Treated Commodity Storage Area Dimensions: _____

E.14. Description of Work Activities in Storage Area (if any): _____

_____

E: ALTERNATE CONDITIONS

E.15. Identify permit condition(s) for which alternate conditions are being requested:

E.16. Describe suggested alternate conditions. If no specific alternate conditions can be suggested, identify which of the following general mitigation measures are possible:

- containment (better containment of methyl bromide within the enclosure)
- dilution (dilute the released methyl bromide with fresh air)
- distance (increase the distance between the methyl bromide and people)
- time (decrease the time people are exposed)