

MINUTES OF MEETINGSan RamonOctober 20-21, 1976

Attendance - per attached list.

Purpose:

To review the design of the El Paso formulation plant and the Mobile triazine plant concerning safe handling of triazine dust and powder, especially with new explosivity and thermal decomposition data. To reconcile a proposed BLADEX® grinding safety guide and the above designs. The attached Agenda was followed.

Results

New explosivity data for more finely ground herbicides, i. e., BLADEX and atrazine wettable powders--while not correlating well theoretically with earlier data--indicate that the explosivity factors are of the same order as for earlier data.

The heat of decomposition of BLADEX (by WRC) appears to be about 25,000 calories/gram mol exothermic, enough to raise the temperature 347° adiabatically, excluding melting. Differential thermal analysis indicates that up to 200°C "other ingredients" do not affect BLADEX decomposition. Slow and mild exothermic decomposition occurs above or beyond 200°C for W.P. and 240°C for technical BLADEX. Atrazine is in same general range. Little is known about decomposition gases--no HCN has been observed so far--more work is needed. Detailed reports will follow; preliminary presentations are attached.

Residual acetone concentrations of above 0.02% w can lead to explosive mixtures above 100°F. The current specification of 0.05% w volatiles, as acetone in BLADEX® should be revised. In practice, product runs under 0.01% w. El Paso incoming feed--especially in tote bins--should be monitored for acetone content or explosive atmosphere. Mobile will strive to avoid such.

"Commercial incidents" - thermal decompositions in BLADEX formulation are documented in the attached reports from Helena Chemical and a Modesto Trip Report. A recent "hydrolysis decomposition" at DEGUSSA's technical BLADEX manufacturing facilities occurred in product drying. (See letter from J. J. Haydel, attached.) In all instances there were no reports of poisonings, injury or significant damage to facilities. Causative explanations may be:

- a. Operating with a blocked hammer mill.
- b. A piece of metal in a hammer mill - tearing screens - overheating extending to product.
- c. Overheating in a product drying system - (DEGUSSA) possibly exacerbated by some impurity.

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No explosion incidents have been reported to date. There are no confirmed incidents regarding atrazine, only rumors of GEIGY decompositions. Mechanisms and sources of overheating or electric discharge were discussed, concluding the following:

Herbicide powder, falling free down in a bin, is not likely to develop a spark potential exceeding 100 milli-joules. This value is well below that needed to ignite dust clouds of BLADEN<sup>®</sup> per attached data. Ground powder, flowing in grinding loops, will gain heat from hammer-milling and may gain static charge flowing in the loops; again, the static charge is not expected to reach 100 mj. The systems are inerted also.

It has been postulated that a piece of metal, coming loose in the system - or escaping detection, etc. - falling free in a large bin or rotating within a ribbon blender will not heat or develop a spark intensity sufficient to cause trouble. Loose metal in hammer mills may be expected to get very hot and could start a thermal decomposition without air.

Tight seals on rotating shafts as in star valves, feeders, screw conveyors and ribbon blenders are sources of heating. However, the heat is removed considerably by the flowing powder and metal mass. In a ribbon blender the powder charge moves over the hot spot drawing off the heat. (Some ribbon blenders will have water jackets). Blender M-1028 at El Paso may hold from 5,500 to 13,750 lbs. of wettable powder feed - has a 75 HP drive - if all the energy input converts to heat (191,000 BTU/hr) and is held adiabatically, the theoretical temperature rise is 115 to 46°F/hr. Product melts at 325°F and decomposition starts at 392°F. There will be heat loss and melting will absorb heat. A blocked-in ribbon blender with or without tight shaft seals will heat up slowly. With extended mixing ribbon blenders need watching for possible overheating.

The tendency of triazine powders to develop and to bleed off static charges is not known quantitatively or relative to other materials. Some measurements should be attempted by Shell Development to orient on this aspect. Electric grounding in bag houses, bins, lines, ducts, etc. is normally adequately provided by Shell's specifications. Such is being provided and will be scrutinized for adequacy of electrical connections.

The El Paso design for powdered formulated product manufacture and handling and for building air/vacuum clean-up systems was reviewed in detail and was accepted as satisfactory subject to some items below:

By way of quick review, the design calls for:

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1. Nitrogen tempering (reduced oxygen) of the gas circulation in each of the three hammer-mill grinding loops (includes oxygen analyzers and alarms.)

2. No nitrogen in receiving or weigh bins, in feed preparation ribbon blenders, product blenders "sack-off bin" or bagged feed slitting.

3. Electric grounding throughout.
4. Dust proof electrical systems, NEMA 12.
5. Magnets at strategic points with full metal detection and feed cut-offs at hammer mills.
6. Indoor bag houses with electrically grounded bags.
7. No rupture discs with large vent headers.
8. Fire hoses and extinguishers at strategic points.

Items to be added and/or pursued are:

- A. Make certain ducts are electrically bonded.
- B. Put water-flooding hose connections and manual shut-off valves on all major "dust" and solids handling equipment or where a significant amount of dust can occur. Provide hose reels conveniently.
- C. Add gas purge on seals where erosion by powder is probable.
- D. Check unit heater motors for adequacy in dusty atmosphere. Correct any problem - use fresh air blanketing if need be so.
- E. Check sandmill "drip-proof motors" for compliance with dust-proof criteria. Correct if problem exists.
- F. Set up inspection incoming totes and grinding loops for presence of acetone. Determine if flammable vapor alarms can be useful on feed hoppers. If so, provide them.
- G. Provide temperature alarms in gas leaving heat exchangers in grinding loops to warn of poor or no cooling.
- H. Review self-contained air masks to permit coping with fumes from a decomposition or overheating.
- I. Provide thermometers on hammer mills to catch any local heat buildup for whatever reason.
- J. Provide for grinding loop automatic shutdown when the secondary filter has a high pressure drop.
- K. Make sure the grinding loop will not be over-pressured by blockage, excessive nitrogen, etc.
- L. Avoid skin temperature in building air (unit) heaters which melt or would decompose the triazines.

Mobile and Vicksburg were also reviewed with limited information on the latter. No difficulties arose re Mobile. Vicksburg should be advised of our safety concepts.

The proposed safety guide and an amended version, more applicable to BLADEX® and to atrazine, were reviewed. It was concluded that the proposed guide should be called a "general purpose pesticide grinding guide" as it was intended and was used originally for materials more sensitive than the triazines and by formulators considered much less skilled and diligent than the Shell plants. Copies of the relevant passages under consideration are attached. The differences are highlighted in that the general guide calls for:

1. Nitrogen tempering of air whenever BLADEX or atrazine is processed instead of only in grinding loops.
2. Outdoor location of bag houses - (suitable in warm southern climates).
3. Water addition by spray headers with remote activation versus plain hose connections.
4. Large blow-out rupture discs with vent-off headers.

It was agreed the draft general guide for grinding Shell pesticides would be rewritten as an all purpose instruction to contract formulators with its full safety features. It will be submitted to Safety and Health before Operations & Distribution uses it in obtaining custom formulation work. Appropriate measures for BLADEX, atrazine are as discussed above.

Toxicology reported that acute inhalation studies with ground BLADEX® showed no untoward effects so far - all test animals had not been examined. Measures should be enforced to keep air clean down to 10 mg. and better yet 5 mg./cubic meter if dust particles run up to 5-8 microns.

Noise control is not overlooked but difficult to tackle till the specific arrangements have been constructed.

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ATTENDANCE

|                        |                                                                                                  |
|------------------------|--------------------------------------------------------------------------------------------------|
| <u>El Paso Plant</u> - | R. J. Gasperi<br>R. A. Page<br>R. G. Powell                                                      |
| <u>Houston</u> -       | F. C. Politz<br>J. J. Haydel<br>H. L. Ott<br>R. B. Howard<br>D. E. Dodd                          |
| <u>A. G. McKee</u> -   | P. O. Dotson                                                                                     |
| <u>Mobile</u> -        | H. S. Row                                                                                        |
| <u>Modesto</u> -       | L. P. Reiss<br>G. W. Gaertner<br>B. I. Sparr<br>J. W. Cotton<br>E. S. Loeffler                   |
| <u>San Ramon</u> -     | H. G. Staaterman<br>C. K. Hahn<br>W. H. Owen, Jr.<br>M. S. Honig<br>H. Moss, Jr.<br>C. M. Parker |

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THE FOLLOWING IS A PRELIMINARY VERSION OF THE AGENDA FOR THE FORTHCOMING  
SAFETY MEETING. IF YOU HAVE OTHER ITEMS, PLEASE ADVISE SOONEST. PLEASE NOTE WE LOOK  
FOR A DETAILED COVERAGE ON IMPLEMENTATION.

BLADEX/ATRAZINE MANUFACTURING SAFETY REVIEW MEETING

AGENDA

SAN RAMON

OCTOBER 20-21, 1976

OPENING STATEMENT

H. G. STAATSMAN

REVIEW OF INCIDENTS IN BLADEX/ATRAZINE  
MANUFACTURE/FORMULATIONS - DISCUSSION

W. H. OWEN

EXPLOSIVITY DATA - OLDER

MODESTO AND  
HOUSTON

- NEW  
- Select content

DECOMPOSITION DATA

HOUSTON/MODESTO

ORIENTATION ON INTENSITY ASPECTS  
OF ELECTRIC DISCHARGE, HOT LIQUID

R. B. HOWARD  
F. POLITZ

PRACTICALITIES RE SPARK CONTROL,  
GROUNDING

ENGINEERING

IMPLEMENTATION SAFETY MEASURES-DUST/POWDER HANDLING

A. EL PASO FORMULATING PLANT

ENGINEERING

B. BLADEX/ATRAZINE MANUFACTURE

1. MOBILE

ENGINEERING

2. VICKSBURG

(OPERATIONS)

C. TOTE LIN TRANSPORT

D. DUST CLEANUP SYSTEMS-AIR/SURFACES

ENGINEERING  
TOXICOLOGY

SAFETY GUIDE FOR BLADEX/ATRAZINE

A. REVIEW OF FEATURES

RECONCILIATION OF GUIDE AND SHELL PLANTS

FORWARD PROGRAMS

CHANGES TO GUIDE OR TO PLANTS

ADDITIONAL DEVELOPMENT EFFORT IF ANY

**LAM 027533**

**ABS-009788**