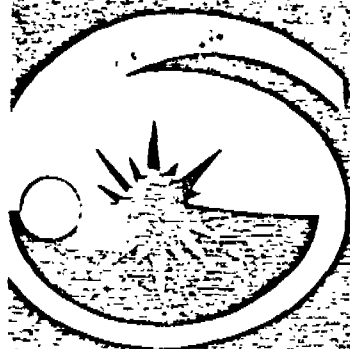




Reactive Chemicals

REACTIVE CHEMICALS QUESTIONNAIRE

(Revised March 1982)

Plant: CHLORINATED METHANES Date: MAY / JUNE 1982

Superintendent: CATHY HOLMES

Status Legend: (✓) Yes; (X) No; (O) Partially; (/) N/A

REVIEWS, TESTS & DATA -

- (✓) 1. Have you had a specific reactive chemicals review of your plant with the site Review Committee within the past two years?
- (X) 2. Was a reactive chemicals review made within the first three months after you took over responsibility of your plant? *RECEIVED OK FROM SAFETY SUPT. & ROYD FORTON TO POSTPONE SO THAT NEW ENGINEERS CAN PREPARE (HAD CONFLICT WITH SHUTDOWN PREPARATIONS)*
3. Are reactive chemicals tests and reviews done with:
 - (✓) a) every expansion or modification to the plant?
 - (✓) b) changes made to the chemistry, i.e. changes in catalysts, additives, etc.?
 - (O) c) equipment changes?
 - (X) d) new suppliers of raw materials or additives?
 - (X) e) automation or computerization?
 - (X) f) demolition projects?
- (✓) 4. Do you know who to contact for assistance in reactive chemicals? Test results, data and information, and technical assistance?
- (✓) 5. Have your raw materials, process streams, products, wastes, and possible mixtures been subjected to screening tests to establish if potential hazards are involved?
- (O) 6. Do you understand the purpose and significance of the following reactive chemicals tests? Flash point, dropweight, flammability, D.T.A., D.S.C., A.R.C., A.R.D., and dust tests?
- (X) 7. Do you personally meet with the reactive chemicals analyst to discuss interpretation of test results as they are affected by possible swings in plant operating conditions? (start-ups, shutdowns, batch cycles, unusual emergency events such as power failures, etc.)
- (O) 8. Are you knowledgeable in the reactive chemicals incidents that have taken place in your sister plants over the past number of years? If not, contact the Technology Center. Has preventive action been taken in your plant?
- (✓) 9. Have you reviewed the possible effects of extremely hot or cold weather on your plant? Cooling capacity, monomer storage life, frozen lines and instruments, gases such as chlorine liquidified, etc.?

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TRAINING —

- (V) 1. Are your operators trained in reactive chemicals hazards? How often?
- (V) 2. Are your operators knowledgeable about the reactivity of the materials they handle, the inter-reactivity of the materials, materials of construction, and materials used by maintenance personnel in the plant?
- (V) 3. Have inter-reactivity charts been prepared with respect to potential hazardous mixtures in the plant?
- (V) 4. Is the reactive chemicals information for the operators in a form that is easy to use in day-to-day operation, and easily able to be passed on to people new to the plant?
- (O) 5. Are maintenance people included in your reactive chemicals program?
- (V) 6. Do you effectively communicate plant reactive chemicals information to other related people at the site such as: product shipping & drum loading; waste disposal; car-wash personnel; process engineering; and analytical lab.
7. Do your people know the reactive chemicals consequences of a high-energy input into your process such as:
- (V) a) external fire?
- (V) b) stuck gas valve on furnace, etc.?
- (?) c) uncontrolled electrical input (dead-headed pump)?
- (V) d) loss of refrigeration?
- (V) e) excessive catalyst addition?
- (V) 8. Do you have procedures and training programs developed to ensure that your personnel know how and when to initiate a reactive chemicals emergency procedure, and what action to take during the emergency?

PROCESS —

- (O) 1. The energy potential of a material is the amount of available energy that could be released in a set period of time under the worst conditions. Do you know the energy potential of your: products; raw materials; reaction mixtures; and waste streams?
- (V) 2. Have you determined the most severe conditions that can develop at each step of your process and do you have operating and/or emergency procedures covering these severe conditions?
- (V) 3. Have you determined what could happen in a "worst case" energy release due to cooling failure, excessive catalyst, agitator failure, etc.?
- (O) 4. Are the potential reactive chemicals consequences of pH, water, rust, light, promoters, and other possible contaminants known?
- (V) 5. Have you determined if residual catalyst on a reaction system can lead to a hazardous situation?
- (X) 6. Are any of the materials you handle pyrophoric when exposed to the atmosphere?
- (V) 7. Do you have a procedure to ensure that the wrong raw material or additive does not get into your process? This includes pipeline transfers. Do you check impurity levels?
- (X) 8. Are there any potential build-up problems with reactive chemicals by recycling, concentrating, etc.?
- (V) 9. Is there a potential for cross contamination of raw materials or products?
- (V) 10. Is the disposal of chemicals handled to avoid reactive chemical problems?
- (V) 11. Do you have procedures to check for the cleanliness of tank cars and trucks before loading?

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- ☐ (✓) 12. Have steps been taken to prevent any reactive chemicals problems in the sewer system? Is a sewer P & ID available?
- (✓) 13. Have you talked to your Reactive Chemicals Committee, your Technology Center, and your Research personnel about possible side reactions in your process which might become uncontrolled?
- (✓) 14. Have you identified your major reactive chemical problem areas?

EQUIPMENT —

- (✓) 1. Have you looked at lubricants, gasket materials, and materials of construction from a reactive chemical standpoint? Do you have procedures to keep unneeded potentially hazardous materials out of your plant?
- (X) 2. Do you have any pumps which if deadheaded can cause a temperature increase which is high enough to initiate an unwanted exotherm? If so, are these pumps provided with temperature alarms and cut-offs?
- (✓) 3. Do feed pumps need to be interlocked with the agitator, where reactive chemicals incidents can occur in a tank or vessel?
- (✓) 4. Is the temperature of the heating medium in an exchanger, jacket or line tracing, etc., safe in relation to the decomposition temperature of the process material?
- (✓) 5. In case of a malfunction of a heating or cooling system (including leakage into the vessel), have you made sure that the temperature of the medium cannot exceed a safe maximum?
- (X) 6. Have you determined that there is no way that a scrubber fluid or a heat transfer medium can back into or leak into a reaction system to cause a high release of energy?
- ☐ (✓) 7. Have you examined reactive chemicals consequences of a: power failure, steam failure, water failure and air failure? Have you examined consequences of a utility failure with subsequent restoring of supply?
- (✓) 8. For critical services, where power must be maintained, does the plant have an alternate source of power?
- (O) 9. Do you have routine non-destructive tests in your plant to determine corrosion, or corrosion rates on piping and equipment, including underground pipelines?

INSTRUMENTATION —

- (O) 1. For all potential sources of reactive chemicals incidents, do you have adequate instrumentation (critical instruments) that can detect and control unwanted operating conditions?
- (✓) 2. Are these critical instruments on a regular preventative maintenance program for calibration and reliability?
- (O) 3. For critical controls, do you have secondary or alternate instruments that will alert you to possible danger if the primary instrument fails?
- (✓) 4. Do these critical instruments fail safe?
- (✓) 5. Do you have knowledge about the safe control limits and allowable limits of deviation? Are these limits documented?
- (✓) 6. Is there a plan of corrective action to be taken if allowable limits are exceeded?
- (✓) 7. If critical instruments are bypassed or overridden, does your plant require this action to be documented?
- ☐ (✓) 8. Have the pressure relief devices in your plant been reviewed to make sure you know the basis on which they were designed to relieve?

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- (✓) 9. For critical instruments where power must be maintained, does the plant have an alternate source of power?
- (✓) 10. In a computer controlled process, have you checked to make sure that the computer program is consistent with the reactive chemicals technology?
- (✓) 11. Are your critical instruments protected from freeze-up under sub-zero temperatures?

DUST EXPLOSIONS —

- (✓) 1. Have you had dust tests run on your solid combustible materials?
- (✓) 2. Do you know the variation of particle size?
- (✓) 3. Do you know the conditions under which dust explosions can occur in your plant?
- (✓) 4. If applicable, has corrective action been taken to prevent dust explosions?
- (✓) 5. Do you insist on a high standard of housekeeping, wherever dusty solids are handled?

STORAGE —

- (✓) 1. Have you identified the tanks in your plant that could have uncontrolled temperature rises due to such things as hydrolysis, polymerization, etc.? Have precautions been taken to detect and control any unwanted temperature increases?
- (✓) 2. Have you reviewed your storage tanks to determine if a flammable mixture—hot spot will develop if the tank level drops and bares the tank heaters?
- (✓) 3. Have you reviewed your requirements for an inert gas blanket on atmospheric storage tanks containing flammables?
- (✓) 4. Some monomer inhibitors require oxygen to be effective. Are you familiar with the requirements of your inhibitors?
- (✓) 5. Are you properly handling and storing catalysts (such as peroxides, metal alkyls, etc.)?
- (✓) 6. Have you reviewed your drum storage procedures for materials that react with water and for reactive monomers, waste, etc.?
- (✓) 7. Have you disposed of all raw materials, products and waste which no longer have value?

WASTE DISPOSAL —

- (?) 1. Have you discussed reactive chemicals hazards of your waste products with the waste control people?
- (✓) 2. Have you audited the waste handling procedures of any contract disposal firms you may use?
- (✓) 3. Do you evaluate the possible reactive chemicals hazards of materials going to salvage or scrap?

GENERAL —

1. What recommendations would you make to improve the Reactive Chemicals program?

- a) _____
- b) _____
- c) _____
- d) _____
- e) _____

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June 1982

REACTIVE CHEMICALS QUESTIONNAIRE
PLANS TO CORRECT DEFICIENCIES

REVIEWS, TESTS, AND DATA

6. Request information from R & D detailing individual reactive chemicals tests.
8. Contact Technology Center for listing of reactive chemical incidents in sister plants.

PROCESS

1. Will have individual engineers determine energy potential of streams.

INSTRUMENTATION

1. Do not have adequate temperature measure in the adiabatic section of the hydrochlorinators. Will look into modifications.
3. Some needed secondary instruments will be installed soon. Will review all critical controls when preparing for upcoming reactive chemical review.

WASTE DISPOSAL

1. Will determine if reactive chemicals hazards have been discussed with waste control people.

C. R. Holmes
Methanes Plant

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