SELF EVALUATION QUESTIONNAIRE

1. TESTING AND EVALUATION OF REACTIVE CHEMICAL DATA

a. Has reactive chemical test data been gathered for the following:

Process materials and mixtures that are normal to the process.
Yes [X] No [ ]

Mixtures that may result from abnormal conditions.
Yes [.] No [X]

Material of construction throughout the process. Are wrong materials of construction identified? Yes [X] No [ ]

Effects of pH	Yes [X]	No [ ]	[ ]NA
Abnormal temperature	Yes [X]	No [ ]	[ ]NA
Water	Yes [X]	No [ ]	[ ]NA
Abnormal concentrations	Yes [X]	No [ ]	[ ]NA
Flammable dusts	Yes [ ]	No [ ]	[X]NA
Explosive range known	Yes [ ]	No [ ]	[X]NA
Rate of pressure rise data	Yes [ ]	No [ ]	[X]NA

Accelerating Rate Calorimetry (ARC) test on reactive mixtures that are handled in drum or larger volumes.
Yes [ ] No [ ] NA

Chemical formulations. Yes [ ] No [ ] NA

Changes of chemical components in formulation
Yes [ ] No [X]

Significant change in concentrations of components in formulation Yes [ ] No [X]

b. Have all systems been evaluated with regard to result from test data? [X]NA Yes [ ] No [ ]

Has all reactive chemicals data been reviewed by the Reactive Chemicals Test Group and Process Engineering as it relates to the process?
Yes [X] No [ ]

Has all data been reviewed by Process Engineering as it relates to pressure relief design?
[X]NA Yes [ ] No [ ]

c. Do all individuals involved with reactive chemical evaluation understand the information on the data sheets and know the limitations for extrapolating operating parameters from the data?
Yes [X] No [ ]

d. Is process data current? [X]NA Yes [ ] No [ ]

Does it thoroughly define hazardous bounds?
[X]NA Yes [ ] No [ ]

Side reactions? [X]NA Yes [ ] No [ ]

Does data include total potential energy available?
[X]NA Yes [ ] No [ ]

Has test data that was generated before 1/1/82 been reviewed with the Reactive Chemical Testing Lab?
[X]NA Yes [ ] No [ ]

Has irrelevant RC data been discarded? [X]NA Yes [ ] No [ ]

Has reactor pressure relief analysis and design documentation been completed for vessels containing reactive materials?
[X]NA Yes [ ] No [ ]

2. CONFIRMING ANALYSIS OF RAW MATERIALS

a. Is there a program in place for confirming positive identification of all raw materials? (Includes outside vendor and Dow supplied raw materials and also raw materials being supplied by pipeline).
Yes [X] No [ ]

Is a Certificate of Analysis required and received for those difficult to test? Yes [ ] No [X]

b. Are inhibitor levels tested on in-coming raw materials that require an inhibitor? [X]NA Yes [ ] No [ ]

3. CRITICAL INSTRUMENTS AND DEVICES

a. Are critical instruments and devices provided with redundancy?
Yes [ ] No [ ] NA

b. Do you have a program for testing all critical instruments?
Yes [X] No [ ]

c. Are there any critical instruments in the process that, if failed, would not alarm or indicate that the signal is incorrect? Yes [ ] No [X] NA

d. Are alarms activated when critical instruments fail? Yes [X] No [ ]

e. Is the emergency reactive chemicals functionality of critical instruments documented? [X]NA Yes [ ] No [ ]

f. Has the process been reviewed within the past two years to determine if adequate monitoring of important parameters is in place? Yes [X] No [ ]

g. Is there a policy covering changes in set points for trips and alarms? Yes [X] No [ ]

4. MATERIALS OF CONSTRUCTION

a. Are unwanted reactions that can be caused by material of construction known by those who can install the wrong material? Yes [X] No [ ]

b. Are there procedures in place to assure that materials such as lubricants, thread compound, valve packing, leak repair compounds, etc. are compatible with the process chemicals? Yes [X] No [ ]

c. Are completely halogen-saturated lubricants used in Chlorine service? [X]NA Yes [ ] No [ ]
Procedures in place to assure compliance.

d. Does the Tech Center provide information/recommendations for material of construction? Yes [X] No [ ]

e. Is information on material of construction sought from suppliers of raw materials? [X]NA Yes [ ] No [ ]

5. SIDE REACTIONS

a. Have side and insitu reactions in your process been adequately researched and identified? Yes [X] No [ ]

b. Have conditions for unwanted reactions been identifi d? Yes [X] No [ ]

PH Yes [X] No [ ] Water Yes [X] No [ ]

Contaminants Yes [X] No [ ]H2 evolution Yes [X] No [ ]

c. Is any part of your process subject to peroxide, acetylide or azide formation? Yes [ ] No [X]

If so, are the sources known and a program in place to keep this under control? [X]NA Yes [ ] No [ ]

6. OPERATING DISCIPLINE

a. Is Operating Discipline documentation current and complete? Yes [X] No [ ]

Has it been reviewed by all operating personnel within the past 12 months? Yes [X] No [ ]
-Need documentation-No reactive chemical concerns.

b. Are the Start up and Shutdown sequences written and available for operating personnel? Yes [X] No [ ]

Are reasons for sequences and consequences of deviation well documented and understood by operating personnel? [X]NA Yes [X] No [ ]
-Need to document. No reactive chemical concerns.

c. Is the process designed to avoid the activation of larg amounts of reactants together at the same time? [X]NA Yes [ ] No [ ]

Is the most critical reactant metered in under carefully monitored rates that are controlled by temperature/ pressure/flow parameters? [X]NA Yes [ ] No [ ]

Is it possible for a critical operating parameter such as flow to be wrong without the operator knowing? [X]NA Yes [ ] No [ ]

Are analytical devices in place to verify critical parameters? [X]NA Yes [ ] No [ ]

d. Are procedures in place to prevent charging of the wrong materials from look-alike drum? [X]NA Yes [ ] No [ ]

Are look-alike drums stored in different storage areas? [X]NA Yes [ ] No [ ]

. Are conditions that approach out-of-range parameters alarmed? [X]NA Yes [ ] No [ ]

Is redundant instrumentation and procedures in place to prevent over-filling vessels? Yes [ ] No [X]
-Not hazardous

7. SCENARIOS

a. Are worse case credible scenarios and corrective procedures documented for each step of the process? [X]NA Yes [ ] No [ ]

b. Have worst case scenarios been highlighted and the process system analyzed for preventive or fail-safe provisions? [X]NA Yes [ ] No [ ]

Do these provide automated protection if the operating personnel fail to take proper action? [X]NA Yes [ ] No [ ]

Are the consequences known by operating personnel when equipment and operating errors occur in the same scenario? [X]NA Yes [ ] No [ ]

c. Do all parts of the process go to a fail-safe mode in a:

Power failure?	Yes [X]	No [ ]	
Cooling loss?	Yes [ ]	No [ ]	[X]NA
Nitrogen failure?	Yes [ ]	No [ ]	[X]NA
Air failure?	Yes [X]	No [ ]	

8. SCRUBBERS

a. Is back-flow of the scrubber chemicals into the process possible? [X]NA Yes [ ] No [ ]

b. Can flammable or reactive materials accumulate in the scrubber medium or vapor space? [X]NA Yes [ ] No [ ]

c. If the scrubber is pH controlled, are pH monitoring and adjustment features provided? [X]NA Yes [ ] No [ ]

d. Are additional scrubber gases such as nitrogen purges etc. controlled adequately to prevent loss of scrubber efficiency? [X]NA Yes [ ] No [ ]

9. WASTE WATER STRIPPER

a. Is the waste water storage vessel protected from the wrong material entering it? [X]NA Yes [ ] No [ ]

b. Is the stripper protected from back flow or back pressure? [X]NA Yes [ ] No [ ]

c. Is level monitoring with low level alarm provided for the stripper and any associated knock-out vessels? [X]NA Yes [ ] No [ ]

10. CATALYSTS

a. Can catalyst in your process transport downstream and become a hazard? [X]NA Yes [ ] No [ ]

b. Can iron chloride be made in your process by inadvertent pH excursions? Iron chloride is an effective catalyst for many reactions and has been responsible for many incidents. [X]NA Yes [ ] No [ ]

c. Are procedures in place for starting up a catalyst or adsorbent bed that prevent a high temperature plug-flow temperature front? [X]NA Yes [ ] N [ ]

d. Are all potential reactions known for improper flows or conditions across the catalyst bed? [X]NA Yes [ ] No [ ]

e. Can the catalyst be affected by material of construction, or some ingredient in the formulation? [X]NA Yes [ ] No [ ]

f. Can an unintended material backflow or migrate into the process and have a catalytic effect? [X]NA Yes [ ] No [ ]

11. INHIBITORS

a. Are inhibitor levels monitored? [X]NA Yes [ ] No [ ]

b. Are inhibitors temperature sensitive with respect to effectiveness? [X]NA Yes [ ] No [ ]

c. Is freeze protection necessary? [X]NA Yes [ ] No [ ]

d. Is separation of inhibitor from product temperature depend nt? [X]NA Yes [ ] No [ ]

. Does the inhibitor require a small amount of oxygen to be effective? [X]NA Yes [ ] No [ ]

If so, are oxygen levels monitored? [X]NA Yes [ ] No [ ]

f. Is the inhibitor affected by material of construction or vice versa? [X]NA Yes [ ] No [ ]

12. LAB CHEMICAL STORAGE

a. Is there a policy governing ownership responsibility for lab chemicals? [X]NA Yes [ ] No [ ]

b. Has the material of construction for the chemical containers been tested for long term compatibility? [X]NA Yes [ ] No [ ]

c. Is there a receiving procedure to prevent chemicals from being left at a delivery point for excessive periods of time? [X]NA Yes [ ] No [ ]

d. Is the storage life/self-reactivity/aging data known for stored materials so as to establish a maximum storage age at a given temperature? [X]NA Yes [ ] No [ ]

e. Are unstable chemicals given special storage provisions? [X]NA Yes [ ] No [ ]

Are stored items in drums checked for over-pressure? [X]NA Yes [ ] No [ ]

Are containers occasionally found to be over-pressured? [X]NA Yes [ ] No [ ]

Is moisture a problem with some chemicals you store? [X]NA Yes [ ] No [ ]

f. Are drums of materials that are sensitive to water stored indoors? [X]NA Yes [ ] No [ ]

13. HAZARDOUS MATERIAL HANDLING

a. Have inadvertent operations been identified which could subject process materials (specifically gases) to heat of compression? [X]NA Yes [ ] No [ ]

b. Do you vacuum break with nitrogen? [X]NA Yes [ ] No [ ]

c. Do you monitor for oxygen content in the part of the proc ss that operates under vacuum? [X]NA Yes [ ] No [ ]

Is oxygen monitored in process systems where the compon nts can be easily oxidized? [X]NA Yes [ ] No [ ]

d. Is the design of your process system such that it is virtually impossible for two highly reactive chemicals to get together unintentionally? [X]NA Yes [ ] No [ ]

Are there redundant safeguards? [X]NA Yes [ ] No [ ]

e. Are drums of materials that are incompatible kept segregated?
[X]NA Yes [ ] No [ ]

Are they identified by label/color code etc.?
[X]NA Yes [ ] No [ ]

f. Are procedures, equipment, and training in place to quickly handle leaks of hazardous materials to prev nt exposure to the plant or community?
Yes [X] No [ ]

g. In the event of a leak or spill do you know which absorbent material to avoid? Spontaneous combustion incidents are common. Yes [ ] No [X]
-But will find what can be used to absorb MEKP

h. Can material be concentrated or built up in a recycle stream to the point of instability? [X]NA Yes [ ] No [ ]

Can polymer or other materials in the process build up and become pyrophoric when exposed to air?
[X]NA Yes [ ] No [ ]

i. Are any peroxide-forming materials and conditions present in your process? [X]NA Yes [ ] No [ ]

14. WASTE HANDLING

a. Is sawdust or cellulosics based materials used as an absorbents? Yes [ ] No [X]

If so, are procedures and ratios specified to prevent reaction or spontaneous combustion? [X]NA Yes [ ] No [ ]

b. Have all absorbents in use been tested with the proc ss materials? [X]NA Yes [ ] No [ ]
-Will change this answer when 13g is answered.

Are there any prohibited absorbents? [X]NA Yes [ ] No [ ]

Do employees know? [X]NA Yes [ ] No [ ]

c. Are different waste chemicals collected in a common container?
[ ]NA Yes [ ] No [X]

If so, is control of what is put into the container vested in one person or job? [X]NA Yes [ ] No [ ]

Are pH or other analytical procedures used as part of this control? [X]NA YES [ ] NO [ ]

d. Are joint procedures with Environmental Services periodically reviewed? Yes [X] No [ ]

. Does control of waste include? Yes [ ] No [ ]

Material of construction	Yes [X]	No [ ]
Time limit of storage	Yes [X]	No [ ]
Written procedure for disposal	Yes [X]	No [ ]
Ownership	Yes [X]	No [ ]

15. HEELS IN TANK CARS, TANK TRAILERS, BARGES, PROCESS LINES AND STORAGE VESSELS

a. Are procedures in place to analytically test all heels to assure that the look-alike heels are what they are supposed to be? [X]NA Yes [ ] No [ ]

b. Is odor used as an identifying method? [X]NA Yes [ ] No [ ]

c. Are low points in pipelines checked? [X]NA Yes [ ] No [ ]

d. Are heels from cleaning, such as water, a hazard with your products? [X]NA Yes [ ] No [ ]

e. Are vapors in pressurized vessels/trailers analyzed if no liquid sample can be obtained? [X]NA Yes [ ] No [ ]

f. Are dedicated transport vessels used without confirming analysis of the heels? [X]NA Yes [ ] No [ ]

16. EXCHANGERS

a. Is the exchanger media compatible with the process mat rial? [X]NA Yes [ ] No [ ]

b. Will a leak into the process be hazardous? [X]NA Yes [ ] No [ ]

c. Is monitoring provided to detect a leaking exchanger? [X]NA Yes [ ] No [ ]

d. Is the exchanger essential to the safety of the process? [X]NA Yes [ ] No [ ]

e. Is temperature monitoring provided around the exchanger? [X]NA Yes [ ] No [ ]

f. Has the maximum temperature of the reboiler been evaluated with respect to length of time exposure, such as during total reflux conditions? [X]NA Yes [ ] No [ ]

g. Have the effects of a leaking steam valve to a shutdown reboiler been evaluated? [X]NA Yes [ ] No [ ]

h. Has the heat history of polymerizable bottoms been evaluated with respect to reboiler temperature and l ngth of time of exposure? [X]NA Yes [ ] No [ ]

i. Have you evaluated the effects of recirculation or cooling failure? [X]NA Yes [ ] No [ ]

17. AGITATORS

a. Is monitoring provided to detect agitator failure? [ ]NA Yes [ ] No [X]

Motor amps? Yes [ ] No [X]
Rotation detectors? Yes [ ] No [X]
Blade detector? Yes [ ] No [X]

b. Has agitator failure been evaluated during the step with the most available energy to determine if a run-away can occur? [X]NA Yes [ ] No [ ]

c. Are reactive feed flows interlocked to stop on agitator failure? [X]NA Yes [ ] No [ ]

d. Are run step procedures in place to assure proper mixing and proper reaction? [X]NA Yes [ ] No [ ]

e. Are amp readings alone on the agitator appropriate to determine the progress of the reaction? [X]NA Yes [ ] No [ ]

18. STATIC MIXERS

a. Are temperatures before and after monitored? [X]NA Yes [ ] No [ ]

b. Are there sufficient reactants within the mixer that overheat could result if flow of reactants is suddenly stopped without purge-out? [X]NA Yes [ ] No [ ]

). PUMPS

a. Are feed pumps interlocked with shutdown trips?
Yes [ ] No [X]

b. Are pumps temperature monitored on or within 6-inches downstream of the pump casing to detect deadheading?
Yes [ ] No [X]

c. Does the monitoring scheme assure detection and alarm on pump cavitation? Yes [ ] No [X]

d. Are pump seals monitored for flow of seal fluid and seal 1 ss
Yes [ ] No [X]

. Have seal fluid leaks into the process streams been evaluated
Yes [X] No [ ]

f. Is temperature monitoring provided for pumps that are used for mixing? Yes [ ] No [X]

20. BACK FLOW

a. Have potential back flow scenarios been evaluated?

b. Has process back-flow been effectively prevented in the following?

Feed lines	Yes [ ]	No [ ]	[X]NA
Nitrogen connections	Yes [ ]	No [ ]	[X]NA
Condensate	Yes [ ]	No [ ]	[X]NA
Gas cylinders	Yes [ ]	No [ ]	[X]NA

c. Are means other than block valves and check valves provided to prevent back flow, such as stopping pumps and depressuring?
Yes [ ] No [X]

21. LOW FLOW RATE

a. Have low flow rates been evaluated for their effects on reaction stability and heat removal? [X]NA Yes [ ] No [ ]

Example: throttle back during startup/shutdown/hurrican shutdown.

b. Has total reflux of your distillation column or reactor systems been evaluated for loss of overheads through leaking overhead valves? [X]NA Yes [ ] No [ ]

Concentration of unstable components in certain trays [X]NA Yes [ ] No [ ]

Overheating/heat history problems in the reboiler? [X]NA Yes [ ] No [ ]

22. RELIEF DEVICES and VENT SYSTEMS

a. Have pressure relief systems been designed for worse case credible reactive chemicals run-away? [X]NA Yes [ ] No [ ]

b. Are relief valve discharge headers combined with oth r vents? [X]NA Yes [ ] No [ ]

If so, is there a reactive problem? [X]NA Yes [ ] No [ ]

c. Have hazard analysis been performed and documented to defin credible reactive pressure relief scenarios? [X]NA Yes [ ] No [ ]

d. Does documentation of reactive pressure relief designs meet minimum requirements as it applies to the following? [X]NA Yes [ ] No [ ]

Reactive chemicals tests or kinetic data used as a basis [X]NA Yes [ ] No [ ]

Scenarios used for design. Required capacity [X]NA Yes [ ] No [ ]

Device size, PSV orifrice, manufacturer, serial no., spec sheet [X]NA Yes [ ] No [ ]

23. COMPATIBILITY CHART

a. Has a current cross compatibility chart been developed for displaying chemical compatibility of the materials used in the block that may be mixed unintentionally? Yes [X] No [.]

b. If so, are the materials that are self-reactive included in the data? Yes [X] No [ ]

c. Is the compatibility chart posted where all block employees can use it? Yes [X] No [ ]

d. Is there a policy for keeping the cross-compatibility chart up-to-date? Yes [X] No [ ]

24. REACTIVE CHEMICAL TRAINING

a. Is periodic reactive chemical training conducted and documented? Yes [X] No [ ]

b. Does reactive chemical training include materials specific to the block? Yes [X] No [ ]

c. Has hazard information of chemical mixtures that can be reactive/flammable/explosive been included in the training program? Yes [X] No [ ]

d. Is the cross-compatibility chart included in the periodic reactive chemical training? Yes [X] No [ ]

e. Are case histories of past incidents in your unit, the Dow world, and the chemical industry that are r lat d to the process you operate included in the training program?

Yes [X] No [ ]

f. Have potentially wrong mixtures or procedures been emphasized in the training program so that employees will know not to allow certain chemicals to mix or to get out of parameters?

Yes [X] No [ ]

g. Are employees trained on the ways instruments and control devices are prone to fail? [X]NA Yes [ ] No [ ]

h. Are employees trained on materials of construction that can cause a potential reactive chemical problem?

Yes [X] No [ ]

25. REACTIVE CHEMICAL REVIEWS

a. Are all processes in the block reviewed-by line supervision and engineers, technology center, and Safety Superint ndent at least every two years? Yes [X] No [ ]
-3/91 was last date.

b. Is a Reactive Chemical Committee Review held for your processes every two years or within 90 days of a new superintendent?

Yes [X] No [ ]

c. Are process changes reviewed by members of the Reactive Chemicals Committee before they are implemented? Yes [X] No [ ]

d. Are pre-startup reviews held for process changes and recommissioning out-of-service equipment? Yes [X] No [ ]

e. Are product formulation changes reviewed by the Reactive Chemicals Committee? Yes [X] No [ ]