EN-1029

E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED

WILMINGTON, DELAWARE 19898

ENGINEERING DEPARTMENT

cc: W. D. Webb - Design
C. W. Cooke, Jr.-ICD-Chest.Run (Item 5)
W. V. Weidman-ICD-ChestnutRun (Item 5)
B. R. Vaughn-Tex.Fib.-Kinston
J. V. Flynn-Orchem-Chambers Works
R. C. 32

PLAINTIFF'S EXHIBIT DUP-2317

March 20, 1973

PRESENT:
J. R. ALLEN - CHAIRMAN - ESD
E. R. BROOKS - CONSTRUCTION - RED MILL
E. C. JONES - PURCHASING
G. E. LANG - ESD
A. O. MC ALISTER - DESIGN
H. A. MOAK - DESIGN
R. L. MOONEY, JR. - CONSTRUCTION - HOUSTON
J. P. MULROONEY - ELASCHEM - LOUISVILLE
E. M. O'DONNELL - TEX. FIB. - WAYNESBORO
L. M. PERRY - PHOTO PRODUCTS - PARLIN
W. M. UHRICH - CONSTRUCTION
T. C. WARNER - ORCHEM - CHAMBERS WORKS
J. W. KALIS, JR. - STANDARDS SECTION J W Kalis Jr

VISITORS:
* Attended - February 21, 1973
** Attended - February 22, 1973
*** Attended - February 21-22, 1973

*N. R. WALLNER - BIOCHEMICALS - HOUSTON
**J. C. BESPARKA - BIOCHEMICALS - HOUSTON
*F. H. WINTERKAMP - BIOCHEMICALS - HOUSTON
*G. L. MC NEILL - BIOCHEMICALS - HOUSTON
**A. H. MUMMA - BIOCHEMICALS - HOUSTON
*L. G. KNIGHT - BIOCHEMICALS - HOUSTON
***M. C. MOORE - BIOCHEMICALS - HOUSTON
***A. J. HELMLE - BIOCHEMICALS - HOUSTON
***J. C. COUNTS - BIOCHEMICALS - HOUSTON
**H. W. KOPP - BIOCHEMICALS - HOUSTON
*H. WHEELES - CONSTRUCTION - HOUSTON
*W. J. GREELEY - BIOCHEMICALS - HOUSTON
*D. S. WARNER - BIOCHEMICALS - HOUSTON
**R. P. GINANDT - BIOCHEMICALS - HOUSTON
***G. E. HIRTH - BIOCHEMICALS - HOUSTON
***L. W. PERSHKE - BIOCHEMICALS - HOUSTON
***R. E. REED - BIOCHEMICALS - HOUSTON
***W. R. SPIGGS - BIOCHEMICALS - HOUSTON
***K. A. WARD - BIOCHEMICALS - HOUSTON
***J. N. MONTGOMERY - ELASCHEM - PONTCHARTRAIN
***H. J. DUCOTE - ELASCHEM - BEAUMONT
***G. C. VAN CLEAVE - PID - VICTORIA
***M. F. HENNESSEY - PID - VICTORIA
*M. W. HARTNETT - CONSTRUCTION - VICTORIA
*J. M. MEEKS - CONSTRUCTION - VICTORIA

DUP 1008615

DU 051697

***W. I. MUIR - CONSTRUCTION - CORPUS CHRISTI
***W. H. DAVIS - I&D - BURNSIDE
***C. C. PRING - PLASTICS - SABINE RIVER
*N. W. WISE - CONSTRUCTION - SABINE REGIONAL SHOPS
***S. E. WENZEL - ELASCHEM - LOUISVILLE
***R. DE WITT - ORCHEM - CHAMBERS WORKS
***A. C. WOODWARD - BM&I - WILMINGTON
***R. N. MC CORMICK - ESD - ETC - WILMINGTON
***H. E. HUCKINS - DESIGN - WILMINGTON
***E. B. DAVIS - DESIGN - WILMINGTON

STANDARDS SECTION - PROCESS INSULATION SUBCOMMITTEE
MINUTES FOR THE SYMPOSIUM HELD WEDNESDAY-THURSDAY, FEBRUARY 21-22, 1973
AT THE RECREATION CLUBHOUSE, HOUSTON PLANT

WEDNESDAY, FEBRUARY 21, 1973
8:30 A.M.

- F. H. Winterkamp, General Mechanical Superintendent, welcomed the group to the Houston Plant.

- J. C. Counts reviewed the two-day program. Safety procedures and precautions while on the plant site were also covered.

- E. B. Davis, Standards Assistant Manager, Design Division, discussed the history and development of the Du Pont Standards Program. Of interest is that over 200 people actually work on standards. These people represent the industrial, engineering, and auxiliary departments.

- J. W. Kalis, Jr., Standards Engineer, Design Division, illustrated the solution of a field insulation problem by using the standards.

- J. R. Allen, Senior Consultant, Protective Coatings and Insulation, ESD, Engineering Department, Chairman of the Process Insulation Subcommittee, discussed the reorganization of Insulation standards. Some time ago, the subcommittee determined there was an excessive number of standards to satisfy a variety of viewpoints, particularly in the Application Section. Over 50 specifications covering application are reduced to 16. These specifications are now based on the operating temperature range. The specifications cover hot and cold systems and for economic considerations systems for intermediate temperature ranges were provided. It is impractical to include all application practices, materials and systems used by different plants. However, a reasonable range of alternates is included.

  In recent years, the Materials Section was updated and significant revisions and additions were made to the Design Section. Two Design specifications covering hot and cold systems will help the user select the proper system from the choices offered in the Application specifications.

DUP 100816

A few years ago, the Design Division and some plants were using different specifications. Presently, except for special conditions, the specifications are selected from the standards. It is the subcommittee's desire to make the Insulation standards satisfactory for both new construction and plant work.

One of the more critical problems discussed was the subcommittee's need to provide a suitable material for austenitic stainless steel at high temperatures. Through the efforts of the Industrial Chemicals Department, a perlite-silicate insulation was developed. B&B Insulation Incorporated is licensed to market this material which should be available in a few months.

- G. E. Lang, Insulation Consultant, ESD, Engineering Department, OSHA Coordinator for the Process Insulation Subcommittee, discussed the impact OSHA has had regarding insulation. Dust, and particularly asbestos dust, when handling insulation, is the major problem. The two main objectives of the subcommittee to overcome the problem is: First, indicate OSHA references in the standards. Very shortly, Standard SNLA will be issued with reference to Standard S-T, Measurement and Control of Asbestos Dust Exposure. The second objective is to eliminate the use of asbestos bearing materials such as calcium silicate and woven asbestos cloth. After two years, some manufacturers of calcium silicate are beginning to produce an acceptable asbestos free product. The Codes 102 and 102.1 in SN100M show the approved manufacturers of asbestos free calcium silicate insulation. The problem with asbestos will still be around for some time since existing insulation in the field may require removal or maintenance. It appears more difficult to find a suitable substitute for the woven asbestos cloth. Only partial success has been found by using treated glass cloth and Nomex with sodium silicate as an adhesive on removable, reuseable insulation. This would have a lower temperature limit than asbestos cloth.

- G. L. McNeill, Production Superintendent, Houston Plant, Plant Coordinator for OSHA, discussed the methods used on the Houston Plant to comply with OSHA. Particular importance was given to the accuracy of monitoring dust samples. For determination of proper monitoring devices, contact Dr. Richard J. Hubiak of Haskell Laboratories.

- H. A. Moak, Senior Engineer, C&D Section, Design Division, Engineering Department, and subcommittee member, presented a talk on economic thickness of insulation. Insulation reduces cost by conserving energy. The Company spends in the range of $15-20MM a year on thermal insulation. Usually only the initial investment such as labor and cost of materials used to make an evaluation. There are many variables which should be included but are found to be time-consuming which tends to discourage full evaluations.

DUP 1008617

A computer economics program has been developed to include all the significant variables. Slides of the computer output sheets were shown which indicated 18 variables in addition to labor, material, and "K" factor. The economics are calculated on a "Total Annual Cost Basis". Any or all the variables can be used in this system. One of the more significant variables is generated energy cost. The future cost of fuel to generate energy must be considered. Fuel cost varies in different parts of the country. Upon examining current projects, insulation on flanges and valves is economically justified for generated energy systems. Thicker insulation could result in a saving in an air conditioned building since cost of heat removal is more expensive than the generated energy cost.

The computer system is currently used to evaluate the insulation thickness economics for generated energy systems, based on site economics for all major projects handled by the Engineering Department. For individual insulation problems where the computer system of economics may be beneficial, contact H. A. Moak, 8-121-3017.

- R. L. Mooney, Jr., Insulation Superintendent, Construction, Houston Plant, and subcommittee member, discussed aluminum jacketing and reinforced mastics. It was mentioned that stainless steel jacketing would cost three times that of aluminum jacketing. Aluminum jacketing is well established as a standard finish and is used exclusively in the Gulf Coast area except where special corrosive conditions exist. The .016 smooth aluminum with 3 mill film and 5016 Kraft paper on the P.V.A. was developed to overcome the corrosive problems at several plant sites. In September of 1971, this jacketing was applied to several pieces of equipment. No sign of corrosion is indicated. The Victoria Plant has been using the white epoxy coated aluminum jacket for two years with success. Test panels at Corpus Christi show a faster chalking rate than is desirable. It may be necessary to use the new Acrylic film aluminum jacket at this location. Generally, aluminum jacketing is used on straight pipe, cylindrical portions of equipment, and two piece fitting covers.

A reinforced mastic finish is used on heads of equipment, large ells, bends, valves, and flanges. The reinforced mastics are divided into the breathing types used on hot insulation and the non-breathing or vapor barrier mastics for cold insulation. The breathing types of mastics in SN700M are Codes 706, 725, and 734. Code 734 is the most widely used because it can be spray, brush, or trowel applied and the drying time is faster. Spraying is recommended for large surface areas, with 30-1 airless spray equipment by Graco Company. For spraying small heads and large fittings, a converted five-gallon 24-1 Graco extruder works successfully. The non-breathing types or vapor barriers in SN700M are Codes 709, 718, 719, and 731. The Code 709, Fiberated Asphalt Cut Back, is the most versatile vapor barrier since it may be used as a bedding compound or joint sealer. This is good on large jobs when spraying the inside of pipe insulation and the edges at the same time. The Hypalon® Mastic, Code 731, has the highest

DUP 1008618

purchase cost, however, it does not need a cover over it for protection from weather and chemical spills. The Application standards recommend the proper mastic for a particular insulation within a temperature range.

J. C. Counts, Senior Engineer, Biochemicals Department, Houston Plant, provided informative slides covering actual insulation problems on the Houston site. The considerable cost of insulation on chemical plants was emphasized.

Some examples of problems included insufficient space between equipment to allow for required insulation thickness. Vessels with support lugs were too short to clear the insulation for proper anchoring. Piping and valves installed within the clearance required insulating the tanks. Insulating ball valves have been a problem when the insulation must be cut away for clearance to operate the valves. In every case, the cutting and removal of insulation to obtain proper clearance requires additional labor and reduces the integrity of the insulated system.

It was mentioned that the Pipe, Valves, and Fittings Subcommittee is aware of the ball valve problem. Hopefully, in the near future, a variety of suitable ball valves with extended bonnets will be available.

It was agreed by the group that these insulation problems are typical to all plant sites. This presentation has indicated the importance to "Think Insulation", during the early stages of project design.

WEDNESDAY, FEBRUARY 21, 1973
1:00 P.M.

J. C. Counts reviewed and organized the group for a plant tour. The tour was divided into three groups with a tour guide for each group. The guides W. J. Greeley, D. S. Warner, and R. L. Mooney, Jr. were helpful in answering many questions during the tour. Written matter was distributed prior to the tour which detailed the insulation systems and the installation date on specific piping and equipment. Upon completion of the tour, the group reconvened for informal discussion at the Recreation Clubhouse. General consensus by the group indicated that proper selection of materials and quality workmanship was observed throughout the plant.

The meeting adjourned at 4:30 p.m.

The following vendors provided literature and samples for review at the meeting:

B&B Insulation, Inc. - AF insulation, molded fittings
Howard C. Forrest Company - Insulation saws
Pamrod Inc. - AF insulation

DUP 1008619

Upjohn Company C.P.R. Division - Urethane spray demonstration
Stockdale, Inc. - Coatings, needle guns
Thermon Manufacturing Company - HTM-, electric tracing, steam tracing
Amspec Inc. - Dow foams
Thorpe Products Company - Removable covers, J-M
Techalloy Company - Straps, bands
Premetco International Inc. - Sheet metal, covers
Foster Division Amchem Products Inc. - Mastics, adhesives
Gibson and Associates - Adhesives, hangers, mastics
Sabine Industries Inc. - Spray demonstration
San Ray Development Company - Test plugs hot, cold insulation
Rilco Manufacturing Company, Inc. - Saddles, hanger pads
Plastic Coatings Corporation of Wilmington - Mastics, hanger pads, metal sheeting

JWK:nkm

DUP 1008620