SMC
3/7/93

March 7, 1993

TO: Gerald Wagener, Reactive Chemicals Lab
Gerald Barrilleaux, Reactive Chemicals Lab

XC: St ve Milligan, Glycol II
John Smith, Glycol II

RE: Ethylene Oxide Reactivity in the Presence of Metal Shavings

In the past we have had several tests performed to determine the compatability of EO with various types of metals. I remember that EO & Monel were tested for the EO Scrubber Project (T-60) and EO was tested with stainless, nickel alumina, and carbon steel for the project to metalize the EO Storage (DH) Tanks. If possible I would like to get all the data together in one file for Glycol II for our records. This would be valuable for Reactive Chemicals Reviews, Tech Center Audits, Consolidated Audits, etcetera.
My biggest concern at the present is that rupture disks for pressures below 100 psig are almost always constructed of nickel or a high nickel alloy such as monel. These can be coated with teflon but is it a mistake to put a rupture disk in EO service (to prevent polymerization under PSV's) constructed of a material that would be susceptible to attack by EO?

C g Miller discussed metals & EO with one of you the other day, I belive it was Gerald Barrilleaux but am not certain, and he was given the following data:

From Corrosion Resistance Tables (?)

Good = < 20 ml penetration/yr

CS	->	Good to 400 F
304 SS	->	Good to 310 F
316 SS	->	Good to 400 F
Al	->	Good to 210 F
Hastaloid	->	*
Monel	->	Good to 80 F
nickel	->	Good to 80 F

What was the exact source of this data? Is penetration referring to EO penetration? How does this match up with the Reactive Chemicals work we have done in the past on EO & metals?

Any help that you two can give me on this concern would be greatly appreciated. Please call if you have any questions, ext. 2497.

Regards,

S..ve Cook
LACSDC::SCOOK

Sme
3/16/93

03/15/93

RE: Corrosion Rates of EO with Various Metals

Stev ;

I would not think that the EO corrosion is similar to alkanolamine corrosion unless those were present with the EO. The alkanolamines chelate nickel and therefore the high nickel alloys buy you less corrosion resistance and not more. In EO we have never been of the mind for using Nickel 200 or Monel 400 but rather think 300 series SS.

Hastelloy C-276 would be another typical rupture disk material with very good overall resistance. We do not believe that teflon coating is worthy of trust and you should just rely on the base material.

Call if you need anything else.

Mark J. Bartel

EO COMPATABILITY

4/10/95

CORROSION RESISTANCE TABELS

GOOD = <20mil PENETRATION/YR

EO PENETRATION?

CS → GOOD TO 400°F
304 & 304 SS → GOOD TO 310°F
316 SS → GOOD TO 400°F
Al → EXCELLANT TO 210°F
[illegible] → [illegible]
MONEL → GOOD TO 800°F
[illegible] → [illegible]

INSTRUMENTAL ANALYSIS LABORATORY
ANALYST'S COPY -- 03/18/93

Submittal Date: 03/15/93 Time: 8:23 Lab Sample #: 5613

Results Needed By: 03/17/93 Emergency: Y Overtime:

1st Report To: GREG MILLER Bldg: 5301 Phone: 2212

2nd Report To: STEVE COOK Bldg: 5301 Phone:

Type of Report: B Data Leaving Dow: N

Project/Plant: EO & GLYCOLS-GLYCOL II Account No: 76

Type Problem: 6 Emergency Contact: GREG MILLER Phone: 2212

Reason For Urgency: THIS COATING FORMED ON THE OUTSIDE OF A NICKEL TUBE WHEN A LEAK OCCURRED. NEED TO DETERMINE IF CORROSIVES WERE FORMED.

Description of Problem: STEVE WOULD LIKE TO KNOW WHAT TYPE OF COMPOUND WAS FORMED WHEN THE PRODUCTS FROM THE REACTION OF ETHYLENE OXIDE, ACETALDEHYDE, ETHYLENE GLYCOL AND WATER IN THE ARC BOMB LEAKED ONTO A NICKEL CAPILLARY DUE PROBABLY TO CORROSION OF THE TUBE FERRULES. THIS COULD BE KEY IN THE METALLURGY FOR THIS SYSTEM.

Composition, Hazards, Safety Precautions: THE TUBING USED IS ASSUMED TO BE NICKEL SINCE IT IS MAGNETIC. ARC BOMB CONTAINED EO WHICH LEAKED

Technique Known and Specified: Y Number of Samples: 1

GC/MS: IR: RAMAN: NMR: EDX: SEM: XRD: D XRF: D TEM:

Sample A: #93035 DB5890-51A SCRAPINGS

Sample B:

Sample C:

Sample D:

Sample E:

Sample F:

Sample G:

Sample H:

Sample I:

Sample J:

Other Lab: Y Which Lab: C16 By Whom: GERALD BARRILLEAUX
Customer Project ID: #93035 ARC 93-783
Completed On: 03/18/93 Archive: YES

To: GREG MILLER Dept: GLYCOL II Bldg: 5301
c: STEVE COOK Dept: GLYCOL II Bldg: 5301

ANALYTICAL REPORT DOW CONFIDENTIAL INFORMATION		
La. R&D ANALYTICAL LABORATORIES Bldg 2503	Sample No: 5613	Acct. No: 76
Sample Date: 03/15/93	Preliminary Report Date: 03/18/93	Final Report Date: 03/18/93
TITLE: XRF AND XRD ANALYSIS OF DB5890-51A SCRAPINGS		
Author(s): MELISSA SATTLER Melissa Sattler Phone No(s): 6833		
Reviewer: G Barnes	Report Archive - B1RPT_MT.DTF # 5613 Report Document: Databook Number:	

An elemental analysis using the Philips x-ray fluorescence (XRF) spectrometer was done on the sample. Since only a small amount of the sample was available for analysis, this analysis is only qualitative. The major component in the sample was nickel; the minor components were sulfur, chlorine, and copper; and the trace components were potassium, manganese, and iron. The lightest element detected with this technique is sodium.

X-ray diffraction (XRD) analysis was also done on the sample to identify any crystalline components. Since the sample was amorphous, the components could not be identified with this technique. The XRD pattern is attached.

FN: 5613A1.RD ID: DB5890-51A SCRAPINGS SCINTAG/USA
DATE: 03/16/93 TIME: 15: 44 PT: 10.000 STEP: 0.0300 WL: 1.54060