

EVC Americas
Brunner House

**NOTES OF THE KICK OFF MEETING
OKLAHOMA SLURRY STRIPPING UNIT VISTA CHEMICALS
9 February 1993**

People present:

Douglas Michels	Vista
Peter Schirber	Vista
Clay Fenton	Vista
Andy Wiles	Vista
Tom Snow	EVC
Chris Jones	EVC

1. Basic Design Criteria

- 1.1. Site and number of columns
Oklahoma City
Two columns

- 1.2. Design Throughput
Maximum 15 tonne/hr of PVC
Minimum 7.5 t/hr PVC

What is actually measured is the liquid flow rate and the PVC rate will depend on the concentration in slurry. The slurry concentrations are defined in section 1.8

- 1.3. Grade
One grade only at Oklahoma City: 5385

- 1.4. Slurry temperature
At stripper feed pump: 120F

Slurry temperature after the interchanger will be determined by the heat balance and there is assumed to be no need for an additional after cooler. The slurry temperature should be between 160 and 170 F

- 1.5. Slurry pressure at stripper feed vessel
Range of pressure: 20 to 30 psig. Normally 25 psig.

- 1.6. Typical properties and test methods
IV 0.9 to 0.95 = K value 65.5 to 68.2
Mean Grain size typically 150 μ
Passing 140 mesh 8 to 15 %
Passing 200 mesh 2 to 2.5%,
Apparent density (=bulk density by Vista test)
0.57 g/cc typical, 0.54 g/cc min
Colour, B value 2.5 typical, 3.5 max
Heat stability, 4 max

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Contamination 75 max (dark particles per 100 g on Syntron trough)
30 is typical

VCM in slurry, (in dry polymer) Test by EPA method.

Vista provided for reference, test methods for contamination, (OKC #5A), cold plasticizer absorption (ASTM D3367)

1.7. Strategy for plant operation

The six reactors will operate as one stream, running down into two rundown vessels. Simultaneous rundowns will not be allowed.

The rundown vessels will operate at 85 to 60 psig and they will feed continuously into a stripper feed tank operating at between 20 and 30 psig.

1.8. Slurry concentration %

	Min	Average	Max
from the reactor	36	37.5	39
after rinsing the reactor	31	34.6	36
after rinsing the rundown lines	27	30	36

30 % will be taken as the design value for the feed to the column.

The design flow will be 207 (say 210) US gpm.

2. Location / Plot plan

2.1. Distances

See plot plan

2.2. Elevations

Equipment can be mounted at grade or as required for NPSH and gravity flow lines.

2.3. Hazardous area

Class I Div. II Group D

3. Definition of Battery limits

Slurry: Feed in to the stripper feed vessel

Slurry to the blend tanks

VC Gas From the top of the column

From the stripper feed vessel

Antifoam Make up tank, pumped circulation loop and injection points to run down system and to the stripper feed.

Utilities As required by each unit. Rinse water, cooling water steam, condensate for desuperheater.

4. Flowsheet

4.1. Blowdown

Vista's scope. At present it is expected that this will be two vessels operated in parallel.(32000 gal each). This may be replaced by a

single vessel if proved feasible and economic. EVC to comment on Vista's proposals.

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4.2. Stripper feed vessel

In the EVC scope. Vista have anticipated a residence time of 5 min but EVC will check this. It will operate at 20 to 30 psig. Design pressure should be 150 psig.

4.3. Pumps

Stripper feed pumps will be installed with one per stream and a common spare. The stripper bottoms pumps will have one for each stream with no common spare to minimise dead spots where hot slurry might accumulate and degrade. Tandem seals to be used. EVC will provide recommendations for the mechanical construction of these pumps to increase their reliability.

4.4. Filters

No filter to be provided in EVC scope. Coarse material greater than 4 mm will be removed by filtration before the blowdown vessel.

4.5. Heat interchanger
EVC to specify

4.6. Heat recovery scheme

It is not planned to try to recover heat from the condenser

4.7. Column

EVC to specify. The two columns should be free standing and close enough to allow a common access platform

4.8. Condenser

Limitation on temperature of gas outlet. Not more than 130 F
Minimize dP on the condenser.

Vista does not propose to have a separate pressure control on each column. The columns will be connected directly to the suction of the recovery compressors which will have pressure control of the suction by recycling gas from the delivery. Since accurate pressure control of the top of the column is essential to the stable operation of the column, EVC will specify the maximum tolerance of the pressure variations for this system to be successful. (± 0.02 bar g / 0.3 psig) was stated at the meeting but to be confirmed)

ICI Australia have just installed a conventional shell and tube instead of a spiral, on cost grounds. EVC will propose a similar one for Vista.

4.9. Antifoam

EVC specifies the use of Bevaloid 6683. Vista should contact Derek Clark of Rhone Poulenc Chemicals, Beverley. Fax no (44) 482 860 598. They should ask for evaluation samples to test and approve.

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The system will include make up tank, agitator, circulating pumps, injection systems.

5. Instruments / Control

5.1. Computer / DCS

A new computer system is to be installed at Oklahoma, probably a Taylor Mod 300. All normal operations are to be under computer control. Non-routine operations such as isolation for maintenance will not be automated to the same extent.

5.2. Sequence definition

Will be defined in the form of an English description of the operating states and how to change from one state to another, and the actions in case of abnormal condition.

5.3. Local instruments

EVC will give its recommendations. Vista may add to these during the detailed design if they require. Normally there will be no bypasses around the control valves. Local temperature and pressure indicators will be installed with board indicating instruments. No local flow indicators. Orifice flanges on inlet side of cooling water to condenser, but no indication unless required for control.

5.4. What operations are to be done manually?

Only non-routine operations such as isolation for maintenance.

6. Requirements for emergency situations / power failure

Frequency of interruptions

Power failure relatively frequent. about once per month

Steam failure several times a year.

During such emergency situations, it is not acceptable to discharge slurry to the sewer or to put unstripped slurry to the blend tank.

Space will be allowed in the column sump for the dumping of the slurry in case of outlet pump failure.

Provision of rinse water:

Rinse water (city water) is said to be reliable or at least it is most unlikely that there is a failure of rinse water at the same time as the failure of electricity or steam. Rinsing nozzles in dump and feed tank.

EVC will determine whether placing the stripper bottoms pumps on emergency power is the best option for handling power outages. Vista will determine if there is capacity in the emergency power system for the stripper bottoms pumps.

7. Codes and Standards

7.1. Environmental and safety standards

Gaseous Effluents:

Present limits are 420 ppm (on a PVC basis) total emission from the reactor and downstream, excluding fugitive emissions. This is based on a 24 hr average. However, by closing the reactor process and installing a continuous stripper, and sending the recovery vent to an incinerator, Vista is expecting much lower than this to cover possible future emission limits.

Liquid effluents

Liquid effluent should have no more than 200 ppb of VCM in the liquid phase. Solids are not a problem because there is an effective solids separation system. VCM in PVC should not exceed 1 ppm

Safety

Relief valves will have rupture disks beneath them. They will not need to be duplicated with block valves beneath them. All relief valves discharge to atmosphere at a safe location, except for thermal expansion RVs

There are no hard wired interlocks, independent of the computer in this section of the plant. A manually initiated shutdown button may be added by Vista at the detailed design stage if required.

Isolation for maintenance

Equipment will be purged with water before bringing it on line after opening for maintenance.

Spectacle blinds at the inlet and outlet of equipment requiring routine maintenance. (inlet and outlet of pumps and spiral heat exchanger)

7.2. Design Codes

As detailed in the attached list

7.3. Units of measurement for design

Flow

Gas	acfm
Liquid	US gpm
Steam	lb/hr

Pressure

Gauge	psig
Absolute	psia
dP	psi

Heat

Temperature	°F
Heat Duty	Btu/hr
Heat Transfer coefficient	Btu/hr,ft ² ,°F
Thermal Conductivity	Btu/hr,ft,°F
Heat Capacity	Btu/lb,°F
Fouling resistance	Hr,ft ² ,°F/Btu

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Heat exchangers		
Area		ft ²
Tube Diameter		in
Tube Thickness		in
Tube length		ft
Shell diameter		in
Power		kW
Viscosity		cP
Dimensions		ft, in
Volume	liq	US gal
	vap	ft ³
	solid	ft ³

7.4. Equipment numbering
EVC numbers to be used

7.5. Instrument numbering
EVC numbers to be used

7.6. Vessel connections
1½" min process connections on pressure vessels. Pressure gauges should be on a 1" flange. All flanged connections.

8. Materials of construction

EVC will make recommendations. In general 316L will be recommended for slurry up to the spiral exchanger. Duplex steel will be recommended for the spiral heat exchanger and for the hot slurry piping and the column. 316L will also be given as an option and Vista may go for quotations for this, but there is a chance of chloride stress corrosion cracking.

No asbestos gaskets. Vista will advise alternative materials

9. Meteorological / site data

Height above sea level	1255 ft
Barometric pressure	14.06 psia 96.97 kPa
Temperatures	9 °F exceeded 99 % of the winter
	100 °F exceeded 1 % of the summer

10. Utilities

10.1. Steam	
Temp	366 °F (saturated)
Pressure	125 - 165 psig
Impurities	Free of any contaminants which could affect PVC quality

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10.2.	Cooling water	Assumed available during power failure.
	Temp	85 °F maximum
	Pressure	80 psig at grade (supply) design 150 psig 40 psig (assumed for return)
	Fouling	0.002 Hr,ft ² ,°F/Btu
10.3.	Water:	
	Rinse water	Assumed available during power failure
	Pressure/Temperature	40 to 60 psig / 70°F
	Quality	good enough for polymerisation so good enough for rinsing
	Reclaimed (centrate) water	100 psig. 100 °F for rinsing out the feed vessel. Filtered to 50 microns but containing the impurities to be expected from centrifuge centrate.
	Seal water	180 to 200 psig
10.4.	Electrical power	
	Voltage, frequency	480 v 3 phase 60 Hz
	Reliability	Frequent failures, 1/month Emergency back up power available for critical drives.
	Instrument power	24 v DC
10.5.	Instrument air	
	Pressure	80 psig (100 psig max)
	Dew point	-40 °F
10.6.	Nitrogen	Not available.
10.7	Condensate	To be used for desuperheating.
	Pressure	25 to 60 psig
	Purity	Free of any contaminants which could affect PVC quality

11. BED Contents

- 11.1. Process description
- 11.2. Operation
English description of the operating sequence for the computer.
- 11.3. Flowsheet / Mass balance
- 11.4. P & I
- 11.5. Process Equipment specs

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- 11.6. Process Instrument specs
 - 11.7. Relief devices
 - 11.8. Items for review by EVC
 - 11.9. Pipe specs (Vista to provide their existing standards for EVC to review)
 - 11.10. Raw materials
 - 11.11. Motor list
 - 11.12. Typical Plot plan
 - 11.13. Typical detail drawings for information

12. Co-ordination procedure

- 12.1. EVC Project Number VIS 160
- 12.2. Vista Project Number RO-05-023-069
- 12.3. Vista Addresses

Technical Matters

P Schirber

Vista Chemicals

900 Threadneedle,

Houston, Texas 77079

PO Box 19029(77224)

Tel 713 588 3841 Fax 713 588 3950

Commercial Matters

E Meyer

Vista Chemicals

900 Threadneedle,

Houston, Texas 77079

PO Box 19029(77224)

Tel 713 588 3249 Fax 713 588 3950

- 12.4. EVC Addresses

Commercial: A B Stryker

European Vinyls Corporation (Americas) Inc.

Licensing Department, Bedford Building

3531 Silverside Road, Wilmington DE 19810, USA

Tel 302 479 1500 Fax 302 479 1514

Technical: C G Jones

European Vinyls Corporation (Americas)

Brunner House, Winnington

PO Box 7 Northwich Cheshire CW8 4DJ England

Tel (+44) 606 704665 Fax (+44)606 783717

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- 12.5. Numbering system for messages
From EVC UK to Vista EVC/V - 001
From Vista to EVC UK VIS/E - 001
- 12.6. Reviews
If required, Vista may visit the UK to review the package, during preparation Arrangements will be made later
- 12.7. Delivery date of BED March 29
- 12.8. Follow up after BED in Houston as required for clarification of the package and follow up during the detailed design.