PLANT ITEM MATERIAL SELECTION DATA SHEET

R1019268I

HOP-ABS-00002 & 3 (HLW)
Silver Mordenite Column

- Design Temperature (°F): 330/59
- Design Pressure (psig) (max/min): +3/-3
- Location: outcell
- Anticipated 40 y radiation dose: gamma $<<2x10^8$ rad, alpha $<< 2x10^9$ rad

Contents of this document are Dangerous Waste Permit affecting

Operating conditions are as stated on sheet 3

Operating Modes Considered:

- Off-normal conditions assume a 7X melter off-gas surge.
- Equipment is maintainable.
- Process conditions for HOP-ABS-00003 are identical to those for HOP-ABS-00002.

Materials Considered:

Material (UNS No.)	Relative Cost	Acceptable Material	Unacceptable Material
Carbon Steel	0.23		X
304L (S30403)	1.00		X
316L (S31603)	1.18	X	
6% Mo (N08367/N08926)	7.64	X	
Alloy 22 (N06022)	11.4	X	
Ti-2 (R50400)	10.1		X

Recommended Material: 316 (max 0.030% C; dual certified)

Recommended Corrosion Allowance: NA

Process & Operations Limitations:

- Equipment will be visually examined for evidence of corrosion during the change-out of the cartridges.
- Develop start-up and shut-down procedure.

ISSUED BY
RPP-WTP PDC
MD 1/26/04
INIT DATE

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1/26/04
EXPIRES: 12/07/05

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This bound document contains a total of 3 sheets.

REV	DATE	REASON FOR REVISION	PREPARER	CHECKER	APPROVER
1	1/26/04	Issued For Permitting Use		JRD	
0	9/25/02	Issued For Permitting Use	DLA	JRD	MHoffmann

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Corrosion Considerations:

a General Corrosion
None anticipated.

Conclusion
Either 304L or 316L would be satisfactory.

b Pitting Corrosion
Pitting corrosion will only be a concern if column is allowed to cool below 225°F in the presence of moisture. For safety, use 316L and develop a procedure to evaluate equipment following any such low temperature event.

Conclusion
At the stated operating conditions, pitting corrosion is not a significant concern. Recommend 316L.

c End Grain Corrosion
None anticipated.

d Stress Corrosion Cracking
Stress corrosion cracking will only be a concern if column is allowed to cool below 225°F in the presence of moisture. See Pitting.

Conclusion
At the stated operating conditions, stress corrosion cracking is not a concern.

e Crevice Corrosion
Crevice corrosion will only be a concern if column is allowed to cool below 225°F in the presence of moisture.

Conclusion
At the stated operating conditions, crevice corrosion is not a concern.

f Corrosion at Welds
None anticipated.

g Microbiologically Induced Corrosion (MIC)
None anticipated.

h Fatigue/Corrosion Fatigue
None anticipated.

i Vapor Phase Corrosion
None anticipated.

j Erosion
None anticipated.

k Galling of Moving Surfaces
None anticipated.

l Fretting/Wear
None anticipated.

m Galvanic Corrosion
None anticipated.

n Cavitation
None anticipated.

o Creep
Creep is not expected at stated operating conditions.

Conclusion
At the stated operating conditions, creep is not a problem.

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OPERATING CONDITIONS

Materials Selection Data

	Silver Mordenite Column
Component (Name/ID)	HOP-ABS-00002
System	HLW HOP

Operations

Chemicals	Unit	Cold Startup	Normal Operation	Standby/Idle	Cleaning	Accident
Aluminum	g/l	Note 2		Note 2	Note 3	Note 4
Chloride	g/l		4.0E-08			2.8E-07
Fluoride	g/l		5.9E-08			4.1E-07
Hydroxide	g/l					
Iron	g/l					
Nitrate	g/l		4.2E-05			3.0E-04
Nitrite	g/l					
Phosphate	g/l					
TOC[♆]	g/l					
Sulfate	g/l		1.5E-05			1.1E-04
Undissolved solids	g/l					
Particle size/hardness	μm (##)					
Other ($NaMnO_4$, Hg, etc)	g/l					
Carbonate	g/l					
pH	-					
Dose rate, α, β/γ (Note 1)	Bq/l		3.4E-9, 4.4E-5			2.4E-8, 3.1E-4
Temperature	°F	330	330	77		392
Velocity	fps					
Vibration						
Time of exposure	#					

- % of total; ## - use Mho scale

Assumptions: Column receives offgases from Catalyst Skid and sends it to the stack

Note 1: Excluding Tritium, Carbon-14, and Iodine-129.
Note 2: Assumes normal air at elevated temperatures.
Note 3: No cleaning operations required. Absorbtion cartridges are disposible.
Note 4: Accident assumes a 7X melter offgas surge.

Comments: Based on stream #HV243

☐ Black Cell

☐ Flushing

♆ List expected organic species:
Use maximum of 2 significant figures