

0078895

CH2M-0802472

**RECEIVED**  
OCT 15 2008  
**EDMC**

Enclosure 5

241-SX-101 AND SX113 WORK PACKAGES AND QUALITY CONTROL ACCEPTANCE  
INSPECTIONS

Consisting of 999 pages, including coversheet

*attached to 0078890*

**Work Order: CLO-WO-08-0579**

**Title: 241-SX-101 INSTALL NEW RADIAL HEPA FILTER**

Date Created: 3/28/2008 07:08:36

Equipment: SX101-WST-FLT-101

SCI: [ ]

Workflow: WO Standard

Planner: Hjellum, AI

Job Plan: WT-106317

WO Type: 4 - MODIFICATION

Assigned: Gauck, Gregory J

Farm/Facility: 241SX

State: Ready For Work

Phase Desig:

PM Id: WT-106317

RAD Risk: Medium

Flow Status: OK

Frequency: 330

CACN: 501956

Project Id:

Date Reqd:

Priority: 2.2 Environmental Compliance

Route Id: CP-FLTRAD

**Description:**

41-SX-101 INSTALL NEW RADIAL HEPA FILTER  
\*N# O-007-1-12-RF-NU-00-E3-Z04059\*  
LETTER VARIABLE

**COMMENTS:**

REQUIREMENTS DOC AND SECT:

\*\*\*\*\*  
REPLACE RADIAL HEPA FILTER PER PROCEDURE 5-VT-710.  
\*\*\*\*\*

DT  
04-23-08

Note: 04-23-08 Scanned/Changes = 44 pgs. (Record-IDs as of 05-24-08) DT-Clerk

**Work Order: CLO-WO-08-0579**

**Title: 241-SX-101 INSTALL NEW RADIAL HEPA FILTER**

Step 1 Of 1 Step Id: 001

State: Ready For Work

Safety Class:

Scheduled Start:

Sched Comp:

Related Step/Link:

**Step Instructions:**

PERFORM FILTER REMOVAL/INSTALLATION PER PROCEDURE 5-VT-710 ALL DATA RECORDED IN PROCEDURE.

Assets Seq	Asset Class	Asset Id	Asset Name	SC/I	Expiration Date
	Equipment	SX101-WST-FLT-101	FILTER, BREATHER, RADIAL, 241-SX	<input type="checkbox"/>	

Trades	Crew	Trade Id:	Trade Description:	Workers	Act Hrs.	Delay Code
		T050	Health Physics Technicians	1	N/A 0	
		C060	Millwrights	1	0	
		T060	Industrial Health/Safety Tech	1	0	
		R050	Nuclear Waste Process Operator	1	0	
		T110	Other Technicians	1	0	

**Attachments:** There are 10 document(s) attached to this work order

Description	Path/Name
<b>Header Attachment</b>	
ENVI-WAC-246-247	__871955__894642__954938__964699__964726__964732.NVI-WAC-246-2
Procedure - 5-VT-710	__894645__954941__964701__964727__964733.procedure - 5-VT-710
RWP - CO-001 Latest Rev	__894646__954942__964702__964728__964734.WP - CO-001 Latest Rev
<a href="http://dmsweb/idmsprod/livelink.exe?func=ll&amp;objId=8597042">http://dmsweb/idmsprod/livelink.exe?func=ll&amp;objId=8597042</a>	<a href="http://dmsweb/idmsprod/livelink.exe?func=ll&amp;objId=8597042&amp;objAction=Open">http://dmsweb/idmsprod/livelink.exe?func=ll&amp;objId=8597042&amp;objAction=Open</a>
<b>Step Attachment</b>	
CEHA 0108-302 S-Complex Filter Replacement.pdf	CEHA 0108-302 S-Complex Filter Replacement__966160.pdf
RWP CO-106.002.Plus AMW.pdf	CO-106.002.Plus AMW__966159.pdf
MSDS 012261 Simple Green.TIF	MSDS 012261 Simple Green__966161.TIF
Pre-Job A-6002-893 R-1.xdf	Pre-Job A-6002-893 R-1__966155.xdf
WHA for SX-101 & 113 HEPA Filter Changes.xdf	WHA for SX-101 & 113 HEPA Filter Changes__966162.xdf
WORK RECORD.xdf	WORK RECORD__966158.xdf

**Electronic Approvals:**

Date	State	Response	Profile	Name	Role
3/28/2008 07:08:44	In Planning	Approved	ret_&_bo_pm_planner	Hjellum, Al	
4/1/2008 08:26:58	In Approval	Approved	ret_&_bo_rad_con	Holcomb, Stephen	bo_rad_con
4/9/2008 13:11:20	Ready For Work	Approved	ret_&_bo_pm_planner	Hjellum, Al	

**FWC**

FWS Completed By: KAB FWC Date: 4-16-09 Update Job Plan (Y/N): N

Completed Satisfactorily(yes,no): Y Asset Condition: NK

Comments: None

IO Id: CLO-WO-08-0579

### Waste Planning Checklist

Will waste be generated?	No	CHEMICAL/PAINT PRODUCTS
Will waste be generated in a radiological buffer area or contamination area?		
Will EQ be removed? (TF-cover blocks, 222S-Process EQ)		
Will waste contact process waste, tank waste, or tank waste contaminated material?		
Will work involve soil removal?		
Will there be any aerosol can(s) disposed of?		
Will asbestos waste be disposed of?		
Will HEPA filters be disposed of?		
Will chemical products or paint be used or disposed of?		
). The following waste minimization techniques will be used? <input type="text"/>		

#### 1. GENERAL DESCRIPTION OF WASTE

##### IO WASTE IN THIS WORK PACKAGE.

this is a new filter install in a new Radial Filter housing.  
 Old housing was removed in another work package (CLO-WO-08-0563).

1a. Estimate Waste Generated Quantity:   Per:  Job Length:

#### WASTE MANAGEMENT CONTROLS

#### Comments

2. Is Waste Regulated as a Dangerous Waste?

2a. Disposition Instructions:

3. Facility Operations has been notified to take samples? (N/A if not required)		
4. Is a container already available for each disposition listed in the instructions?		
5. Does the quantity of the waste exceed capacity of available containers?		
6. Identify satellite accumulation area or accumulation area container(s) locations:		

Prepared By:

Date: 00/00/0000

Complete:

4/1/2008 8:54 AM

WORKING COPY

Data Sheet 1 - QC Inspection Data

Radial HEPA Filter Change out QC Data Sheet*		
Filter component number where HEPA Filter will be Installed (i.e., B201-WST-FLT-101)	2AB4-101 SX101-WST-FLT-101	
Work Package Number	CLO-40-08-05 579	
Date of Inspection	4-11-08	
Radial HEPA Filter (Record Information From Manufacturer's Label)		
Filter Manufacturer	Flanders	
Model Number (identify letter designation of filter to indicate which drawing revision filter is fabricated to.)	O-007-1-12-RF-NU-00-E3-Z04059 <	
Serial Number	1463461	
HEPA Filter Flow Rating	40	(CFM)
HEPA Filter Resistance	.83	(in. w.g.)
Manufacturer's Penetration Test Date	2-4-08	
Verify Filter Aerosol Penetration Has Been Tested by the Manufacturer and is No Greater than 0.03% at 100% of Rated Flow	SAT	UNSAT**
	X	
Seal (thread) Condition (No significant damage or cross threading, etc.)	SAT	UNSAT**
	X	
Comment:		

\* Additional copies of this data sheet shall be made for each individual filter installed by this procedure.

\*\* Any UNSAT conditions found should be described on Comment Page, and the System Engineer should be notified.

QC Inspector: Jon Elliott / Jon Elliott / 4-11-08  
 Signature Print Name Date

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WORKING COPY

Data Sheet 2 - Daily Survey Data

Daily Survey Data Sheet*				
Condition	Number	Date	Time	Initials
Pre-Job contamination and radiation survey number:	N/A			
Post-Job contamination and radiation survey number:	COF 7342	4/16/08	1000	L
Comments: Survey completed by A.L. Johnson <i>[Signature]</i> 4/17/08				

\* Additional copies of this data sheet shall be made as needed by this procedure.

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WORKING COPY

Data Sheet 3 - Filter Installation Data

Radial HEPA Filter Change-out Data Sheet*		
Work Package Number	C10-W0-08-579	
Date of Installation	4-16-08	
Flammable Gas Concentration		IHT Initials and date
Record Filter EIN/Component Number (e.g., xxxxx-VTP-FLT-001)	5A-101-VTP-FLT-001	
Inspect for:	SAT	UNSAT**
No Damage to New HEPA Filter	X	
No Damage to Filter Weather Covers	X	
No Damage to Filter Threads	X	
No Damage to Bird Screen	X	
Bird Screen properly Installed (including alignment with weather cover)	X	
No Missing Fasteners	X	
No Missing Labels on Filter Assembly or Weather Covers	X	
Filter Isolation valve operates properly	X	
No Water in Filter	X	
No Visible Paint, Corrosion, or Other Foreign Objects in Filter Assembly	X	
New Filter Installed Properly with No Discrepancies	X	
Comment:		

\* Additional copies of this data sheet shall be made for each individual filter installed by this procedure.

\*\* Any UNSAT conditions found should be described on Comment Page, a PER should be generated by the FWS for all UNSAT conditions, a work request should be generated by the FWS for all UNSAT conditions to correct the problem, and the System Engineer should be notified.

Craftsman:  / Marc Regimbal / 4-16-08  
 Signature Print Name Date

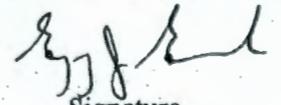
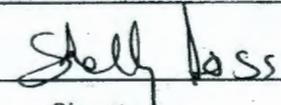
Craftsman: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 Signature Print Name Date

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4/1/2008 8:54 AM

WORKING COPY

Data Sheet 4 - FWS/Engineering/Environmental Review

PER Numbers Generated (if Applicable):		
N/A		
Work Request Numbers Generated (if Applicable):		
N/A		
FWS:		
	KA Bernd	4/16/08
Signature	Print Name	Date
Forward package to System Engineer for review and signature.		
System Engineer:		
	Gregory J. Gank	4/17/08
Signature	Print Name	Date
Forward package to Environmental for review and signature.		
Environmental:		
	Shelly Doss	4-21-08
Signature	Print Name	Date

## Comment Page

(This page may be reproduced as necessary)

Record below any comments encountered during performance of the procedure, and a description of any degraded conditions found and resulting actions taken. Also explain any UNSAT conditions described in Data Sheet 1 or Data Sheet 3

Date: 4/17/08

Shelly Doss from Environmental organization was notified of radial filter assembly installation on SX-101 on 4/16/08

Gregory Gauck.

WDOH notified of new radial filter installed on SX-101 on 4-16-08. Shelly 4-21-08 This radial replaced a G-1 Breather filter & housing. Shelly 4-21-08

CH2M BILL OF MATERIAL

ORIGINAL

B.O.M. Suppl. 0

Material Use: SX-101 RADIAL HEPA FILTER		Wk. Pkg. No.: CLO-WO-08-0579 MB: MB-06-00009		CACN/COA: 501955/FA60	
Date: 03/28/2008		Requestor: Hjellum, Al		Delivery Location: 2704HV - Material Coordinator	
Material Required: 04/03/2008		Special Instructions/Emergency Justification: As defined in TFC-BMS-CP_CPR-C-06, the Engineering and Quality Assurance approvals for this Bill of Material are located in Master BOM MB-06-00009 and are not required to be obtained for each BOM created under the aforementioned Master BOM.		Premium Freight <input type="checkbox"/>	
Mandatory <input type="checkbox"/> Desired <input checked="" type="checkbox"/>		Hjellum, Al (372-2540) 03/28/2008		Not Required per DRA	
Suggested Vendor:		Requestor Gauck, Gregory J (373-1779) 10/30/2006		Manager Cannon, Joel M (372-3241) 10/30/2006	
A Clauses: /A		Engineer Not Required per DRA		QA Engineer Not Required per DRA	
		RadCon Not Required per DRA		Environmental Not Required per DRA	
		Industrial Health Not Required per DRA		Chemical Management Not Required per DRA	
		Safety & Health Not Required per DRA		Resp. Protection Duncan, Vella (373-3852) 03/28/2008	
		Cost Account Manager Shults, Duane L (373-4244) 03/28/2008		Material Coordinator Manager	
		Material Coordinator		Date	

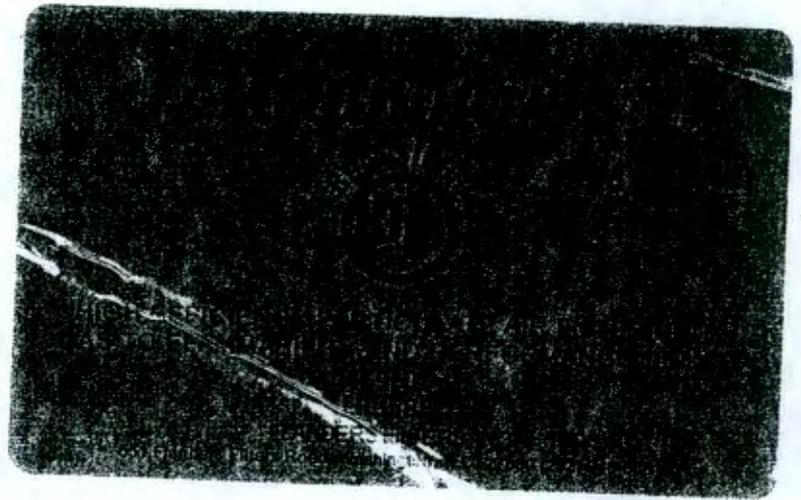
Item	Quantity	Estimated Cost	Safety Class	HAZMAT	MSDS	NRTL	Approval Desig.	Quality Level	QC Approval	Date/Qty Ordered	Order No.	Catalog No.
1	1	213.91	GS				N/A	2	SEA-11-08	03/28/2008, 1.00	10001567	0000632916
Unit	Delivery Date	Storage Level	Date/Qty Staged	Storage Bldg/Area	Storage Location							
EACH		B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)	04/07/2008, 1.00	2101HV/200E	R7-H3							
Material Description: EPA-TYPE FILTER, FILTER, HEPA, 40 CFM RADIAL, 1 1/2 IN. MNPT						Additional Description: FILTER, HEPA, RADIAL, 40 CFM NUCLEAR GRADE, PURCHASE PER RPP-SPEC-28675, CURRENT REV						
Purchasing Description:						Comments:						
Part Number: 1-007-1-12-RF-NU-00-E3-Z04059C			Equipment Type: FILTERS		Manufacturer: FLANDERS FILTERS			Drawing/ECN/Spec Number: RPP-SPEC-28675				

S/W 1463461

\* NCR CH-08-NCR-011

RELEASED COMPLETE

Line # Released: 44 Released To: BARRA  
Signature: [Signature]



ORD NO MEDIA LOT  
280091 104660/1306

MFG NO 85609

F0622996

0-007-1-12-RF-NU-00-E3-Z04059C



1463461

Work Order: CLO-WO-08-0579 ✓

Title: 241-SX-101 INSTALL NEW RADIAL HEPA FILTER

AND

CLO-WO-08-0580 ✓

241-SX-113 INSTALL NEW RADIAL FILTER

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WORK WITH

CLO-WO-08-0563 AND 0564



<b>RADIOLOGICAL WORK PERMIT</b>			Contractor: <b>CH2M HILL Hanford Group, Inc.</b>		RWP Number CO-469
General: [ ]	Start Date 04/09/2008	End Date 10/08/2008	Technical Document Number(s): CLO-WO-08-0563/ CLO-WO-08-0564		AMW Number AW-1411
Job Specific: [X]					

Location: CJW/241 -SX/SX-101&113	Brief Job Description and Type of Area: Replace Breather Filters with Radial Filters (RA,CA, HCA, ARA)
-------------------------------------	---

Radiation Emitted	Estimated Dose Rates	Estimated Contamination Levels	Job Dose Estimate	Risk Value
[X] Alpha [X] Beta [X] Gamma [ ] Neutrons	General Area: 0.5 mrem/hr Maximum Contact: 3 mrem/hr Radiological Worker [ ] I Training Req. [X] II	Beta/Gamma: 100,000 dpm/100cm <sup>2</sup> Alpha: < 20 dpm/100 cm <sup>2</sup>	< 200 person-mrem	MEDIUM
		Internal Dosimetry Requirements		
		[ ] 3 minute WBC	[X] 10 minute WBC	[SI 5] Urinalysis/Isotopes [SI 5] Chest Count

DOSIMETRY		PERSONAL PROTECTIVE EQUIPMENT			SURVEY REQUIREMENTS	
X	HSD-TLD	X	Coveralls		Shoe Covers	SI 8 Grab Air Sampling Required
X	HCND-TLD		Waterproof Suit	X	Canvas Boots	SI 8 Lapel Air Sampling Required
X	Pocket Dosimeter		Goretex Suit	X	Rubber Overshoes	SI 7 Auto. Survey Device
	Electronic Dosimeter		Cap		Rubber Boots	SI 7 Self Survey (if qualified)
SI 5	Finger Rings	SI 6	Hood		Face Shield	HPT Exit Survey Required
	Time Keeping	SI 6	Surgeon's Gloves	SI 5	Full Face Respirator	
X	Entry Control System	SI 6	Leather Gloves		P/PPR	
	Brick	SI 6	Canvas & Surgeon's Gloves		Supplied Air Respirator	SI 4 Continuous
	-Day ACES Auth.		Waterproof Gloves		CBA	SI 4 Intermittent
		SI 6	Arm Sleeves		Undressing Assistance	
			Leaded Gloves			

DRAFT

**SPECIAL INSTRUCTIONS**

- |   |  |
|---|--|
| <p><b>1. VOID LIMITS</b></p> <ul style="list-style-type: none"> <li>• RA: Whole Body dose rate ≥ 100 mrem/hr @ 30 cm.</li> <li>• CA: General area removable contamination levels ≥ 100,000 dpm/100 cm<sup>2</sup> beta-gamma or ≥ 210 dpm/100 cm<sup>2</sup> alpha.</li> <li>• HCA: General area removable contamination ≥ 400,000 dpm/100cm<sup>2</sup> Beta-Gamma or ≥ 200 dpm/100cm<sup>2</sup> Alpha.</li> </ul> <p><b>2. SAFE CONDITION LEVELS</b></p> <p><i>IF a Safe Condition Level is met, stop normal work activities, place the work area in a stable condition, perform the actions stated within the associated Safe Condition Level AND notify the RadCon First Line Manager and Shift Operations Manager that a Safe Condition Level was reached or exceeded.</i></p> <ul style="list-style-type: none"> <li>• RA: Whole body dose rate ≥ 80 mrem/hr, establish/post HRA boundary and secure work activities.</li> <li>• CA: General area removable contamination levels ≥ 80,000 dpm/100cm<sup>2</sup> beta-gamma or ≥ 140 dpm/100cm<sup>2</sup> alpha; establish/post HCA boundary and secure work activities.</li> <li>• HCA: General area removable contamination ≥ 200,000 dpm/100cm<sup>2</sup> Beta-Gamma or ≥ 150 dpm/100cm<sup>2</sup> Alpha., decontaminate to less than these levels</li> </ul> <p><b>3. ACTION LEVELS</b></p> <ul style="list-style-type: none"> <li>• CA: General area removable contamination levels ≥ 50,000 dpm/100cm<sup>2</sup> beta-gamma or ≥ 70 dpm/100cm<sup>2</sup> alpha, decontaminate or apply fixative to reduce contamination to below these levels prior to continuing work activities.</li> <li>• HCA: General area removable contamination ≥ 50,000 dpm/100cm<sup>2</sup> beta-gamma or ≥ 70 dpm/100cm<sup>2</sup> alpha, decontaminate to below these levels.</li> </ul> <p><b>4. HPT COVERAGE</b></p> <ul style="list-style-type: none"> <li>• Continuous HPT coverage is required when removing/replacing filter components</li> <li>• Intermittent HPT coverage is required during set-up and clean-up</li> </ul> <p><b>5. DOSIMETRY/ACES</b></p> <ul style="list-style-type: none"> <li>• Personnel performing hands on work with contaminated components shall ACE in with the appropriate GW or WW Role and the COBIO Role.</li> </ul> | <ul style="list-style-type: none"> <li>• Personnel wearing respiratory protection for radiological purposes shall ACE in with the appropriate respirator role.</li> </ul> <p><b>6. PERSONAL PROTECTIVE EQUIPMENT</b></p> <ul style="list-style-type: none"> <li>• HCA: Arm sleeves and an additional pair of gloves required for reaching inside HCA.</li> <li>• CA: Single set of PPE with surgeons gloves and canvas, leather or canners gloves required for entry.</li> <li>• A hood will be required when:             <ul style="list-style-type: none"> <li>- a worker's head has a potential to contact contaminated surfaces.</li> <li>- contamination may drop from above due to overhead work.</li> <li>- When wearing a respirator</li> </ul> </li> </ul> <p><b>7. SURVEY</b></p> <ul style="list-style-type: none"> <li>• Beta-Gamma and Alpha surveys required during the course of all intrusive work:             <ul style="list-style-type: none"> <li>• Alpha surveys of personnel and equipment required if alpha contamination was detected during the course of performing work.</li> <li>• Alpha survey required if Beta-Gamma contamination is detected.</li> </ul> </li> <li>• Auto Survey Device (ASD) requirements:             <ul style="list-style-type: none"> <li>• If ASD does not have alpha survey capabilities for areas requiring dual personnel surveys, perform a whole body Alpha survey prior to entering ASD.</li> <li>• If ASD is inoperable or unavailable, perform whole body survey(s). Perform a follow-up survey in an operable ASD.</li> </ul> </li> </ul> <p><b>8. AIR SAMPLING</b></p> <ul style="list-style-type: none"> <li>• Work place grab air sampling required when removing/replacing filter components</li> <li>• Lapel air sampling required when personnel are wearing respiratory protection for radiological purposes</li> </ul> <p><b>9. SPECIAL PREJOB BRIEFING</b></p> <ul style="list-style-type: none"> <li>• None required</li> </ul> <p><b>10. OTHER</b></p> <ul style="list-style-type: none"> <li>• N/A</li> </ul> |
|---|--|

RWP Prepared By: S.B. Holcomb		Phone: 373-1263		HPT Phone: 373-3353, 373-0303	
Line Mgt. Print: Sign:		Phone:		Date:	
Sup. Initial:	RC Dir. Print: Sign:	Phone:		Date:	
Acknowledged by:	AJRG Chair (High Risk) Print: Sign:	Date:	Other:	Print: Sign:	Date:
RWP Field Change Approvals:	Line Mgt. Print: Sign:	Date:	RC Mgt. Print: Sign:	Date:	

RADIOLOGICAL WORK PERMIT			Contractor: CH2M HILL Hanford Group, Inc.		RWP Number CO-106, Rev.002		
General: [ ]		Start Date	End Date	Technical Document Number(s): 3-VBP-153; -155; -156; -157; -158; -159; -656; -657; 5-VT-076; -710; 3-VB-491, -735 associated data sheets and work control documents, and CLO-WO-08-0206.		AMW Number	
Specific: [X]		1/22/2008	1/21/2009			AW-1373 Rev.001	
Job Location: All Tank Farm Facilities		Brief Job Description and Type of Area: Air Flow, dP, and aerosol testing of HEPA and/or HEGA filters and passive breather filter removal/replacement to include radial filters. Melt ice plugs in test ports if needed. (HCA/CA/RA/RBA) <b>THIS RWP DOES NOT PERMIT CHANGING OF ACTIVE VENTILATION HEPA and/or HEGA FILTERS.</b>					
Radiation Emitted		Estimated Dose Rates		Estimated Contamination Levels		Job Dose Estimate	Risk Value
[X] Alpha		General Area: < 5 mrem/hr		Beta/Gamma: < 10,000dpm/100 cm <sup>2</sup>		< 200 person-mrem per individual task	
[X] Beta		Maximum Contact: < 100 mrem/hr		Alpha: < 20 dpm/100 cm <sup>2</sup>		Medium	
[X] Gamma		Radiological Worker [ ] I		Internal Dosimetry Requirements			
[ ] Neutrons		Training Req. [X] II		[ ] 3 minute WBC [X] 10 minute WBC [SI 5] Urinalysis/Isotopes [SI 5] Chest Count			
DOSIMETRY		PERSONAL PROTECTIVE EQUIPMENT				SURVEY REQUIREMENTS	
X	HSD-TLD	SI 6	Coveralls		Shoe Covers	SI 8	Grab Air Sampling Required
	HCND-TLD		Waterproof Suit	SI 6	Canvas Boots		Lapel Air Sampling Required
	Pocket Dosimeter		Goretex Suit	SI 6	Rubber Overshoes	SI 7	Auto. Survey Device
	Electronic Dosimeter		Cap		Rubber Boots		Self Survey (if qualified)
	Finger Rings	SI 6	Hood		Face Shield	SI 7	HPT Exit Survey Required
	Time Keeping	SI 6	Surgeon's Gloves		Full Face Respirator		
X	Entry Control System	SI 6	Leather Gloves		PAPR	HPT COVERAGE	
X	Brick	SI 6	Canvas & Surgeon's Gloves		Supplied Air Respirator	SI 4	Continuous
X	1-Day ACES Auth.	SI 6	Waterproof Gloves	SI 6	SCBA	SI 4	Intermittent
		SI 6	Arm Sleeves		Undressing Assistance		
<b>SPECIAL INSTRUCTIONS</b>							
<p>1. VOID LIMITS</p> <ul style="list-style-type: none"> <li>RA: Whole body dose rate &gt; 100 mrem/hour at 30 cm.</li> <li>HCA: General area removable contamination ≥800,000 dpm/100cm<sup>2</sup> beta-gamma or ≥420 dpm/100 cm<sup>2</sup> alpha.</li> </ul> <p>2. SAFE CONDITION LEVELS</p> <p><i>If a Safe Condition Level met, stop normal work activities, place the work area in a stable condition, perform the action(s) stated within the associated Safe Condition Level AND notify the RadCon First Line Manager and Shift Operations Manager that a Safe Condition Level was reached or exceeded.</i></p> <ul style="list-style-type: none"> <li>CA: General area removable contamination ≥30,000 dpm/100 cm<sup>2</sup> beta-gamma or ≥140 dpm/100 cm<sup>2</sup> alpha during filter change-out process; replace filter cover and survey general area outside filter, and suspend work activities.</li> <li>RA: Whole body dose rates &gt; 50 mrem/hr, secure work activities at that location and notify RadCon SME of increased dose rates.</li> </ul> <p>3. ACTION LEVELS</p> <ul style="list-style-type: none"> <li>Catch Containment CA: Distributed removable contamination ≥ 10,000 dpm/100 cm<sup>2</sup> beta-gamma or ≥20 dpm/100 cm<sup>2</sup> alpha; decontaminate to below these levels prior to resuming work.</li> <li>Pre-job dose rate on filter housing prior to opening ≥1 mr/hr (closed window) above background do not open filter housing.</li> <li>If port seal containment is breached, survey area of port breach, if removable contamination is ≥1,000 dpm/100 cm<sup>2</sup> beta-gamma or ≥20 dpm/100 cm<sup>2</sup> alpha, re-seal port, decontaminate to below these levels and notify RadCon FLM prior to resuming work.</li> <li>CA: Removable contamination ≥50,000 dpm/100 cm<sup>2</sup> beta-gamma or ≥70 dpm/100 cm<sup>2</sup> alpha during aerosol testing, establish HCA controls around access port prior to continuing work activities.</li> </ul> <p>4. HPT COVERAGE</p> <ul style="list-style-type: none"> <li>Continuous coverage is required when accessing DOP Ports or opening filter housing.</li> <li>Intermittent coverage for all other work activities.</li> </ul> <p>5. DOSIMETRY/ACES</p> <ul style="list-style-type: none"> <li>Personnel performing hands on work with contaminated components shall ACE in with the appropriate GW or WW Role and the COBIO Role</li> </ul>				<ul style="list-style-type: none"> <li>Personnel wearing SCBA shall ACE in with the SCBA roll.</li> </ul> <p>6. PERSONAL PROTECTIVE EQUIPMENT</p> <ul style="list-style-type: none"> <li>ARA: SCBA required when using heat gun to melt ice plugs.</li> <li>HCA: Additional Arm Sleeves and Surgeons Gloves required for reaching into a HCA.</li> <li>RBA: Arm Sleeves and Surgeons Gloves required for reaching into a CA.</li> <li>CA: Single set of PPE and a second set of gloves (e.g. canvas, surgeons, leather, canners, etc.) required for whole body entry.</li> <li>CA: A hood will be worn when: <ul style="list-style-type: none"> <li>a worker's head has a potential to contact contaminated surfaces,</li> <li>when contamination may drop from above due to overhead work</li> </ul> </li> </ul> <p>7. SURVEY</p> <ul style="list-style-type: none"> <li>The following areas require both Beta-Gamma and Alpha surveys: <ul style="list-style-type: none"> <li>244-TX/242-T, 242-S Evaporator, 241-EW-151, 241-TX-155, 244-AR, ER-311, 241-ER-151, 241-TX-113 &amp; -118</li> </ul> </li> <li>For partial body (arms and hands) entries into a CA from an RBA, or an HCA from a CA, perform a survey of hands, arms chest &amp; face each time hands and arms are removed from CA/HCA.</li> </ul> <p>8. AIR SAMPLING</p> <ul style="list-style-type: none"> <li>Grab air sampling is required during filter exchange when filter housings are open and when melting ice plugs with a heat gun. Sampler shall be located as close as possible to the work area.</li> <li>AKI Air Sampling required during aerosol testing and for downposting ARA.</li> </ul> <p>9. SPECIAL PREJOB BRIEFING</p> <ul style="list-style-type: none"> <li>N/A</li> </ul> <p>10. OTHER</p> <ul style="list-style-type: none"> <li>N/A</li> </ul>			
RWP Prepared By: Keith Gray		Phone: 373-4286		HPT Phone: 438-9294 / 373-3352			
Line Mgt. Print: PA Howard		Sign: [Signature]		Phone: 438-9091		Date: 1-22-08	
RC Sup. Print: KW Gray		RC Dir. Print: EJ Adams		Phone: 373-4286		Date: 1/22/08	
Sign: [Signature]		Sign: [Signature]		373-2927		Date: 1/22/08	
Acknowledged by:		AJRG Chair (High Risk)		Print: [Signature]		Date: [Date]	
RWP Field Change Approvals:		Line Mgt.		Print: [Signature]		Date: [Date]	
		Sign: [Signature]		RC Mgt. Print: [Signature]		Date: [Date]	

Job/Task No.:

Date:

Replace SX HEPA Filters

### WORKSITE HAZARD ANALYSIS

04-16-08

Hazards	Possible Controls	Applicable PPE
<input type="checkbox"/> Electrical	<input type="checkbox"/> Lock out/Tag out <input type="checkbox"/> Barricade <input type="checkbox"/> Electrical Energized Work Permit <input type="checkbox"/> PPE Category (-1 to 4) specify _____ <input type="checkbox"/> AED Location Known/Available	<input type="checkbox"/> Hard Hat <input checked="" type="checkbox"/> Eye/Face Protection
<input type="checkbox"/> Crane or other Lifting Equipment Lifting and rigging objects	<input type="checkbox"/> Special/Critical Lift Permit <input type="checkbox"/> Signalman assigned <input type="checkbox"/> Lifting equip inspected <input type="checkbox"/> Area around crane barricaded <input type="checkbox"/> Spotter	<input checked="" type="checkbox"/> Safety Glasses and side shields <input type="checkbox"/> Face Shield <input type="checkbox"/> Face Shield ARC <input type="checkbox"/> Chemical Goggles <input type="checkbox"/> Welding Hood <input type="checkbox"/> Other: _____
<input type="checkbox"/> Vehicular Traffic and/or Heavy Equipment	<input type="checkbox"/> Traffic Barricades <input type="checkbox"/> Cones <input type="checkbox"/> Signs <input type="checkbox"/> Flagman <input type="checkbox"/> Lane closure <input type="checkbox"/> Communication with equipment operator <input type="checkbox"/> Surface condition	<input type="checkbox"/> Hearing Protection <input type="checkbox"/> Ear Muffs <input type="checkbox"/> Specify type: _____ <input type="checkbox"/> Foam/Ear Plugs
<input type="checkbox"/> Overhead Utilities	<input type="checkbox"/> De-energization req. <input type="checkbox"/> Insulation blankets req. <input type="checkbox"/> Wire watcher req. <input type="checkbox"/> Req. clearance distance <input type="checkbox"/> Safe work zone marked	<input type="checkbox"/> Hearing Protection <input type="checkbox"/> Ear Muffs <input type="checkbox"/> Specify type: _____ <input type="checkbox"/> Foam/Ear Plugs
<input type="checkbox"/> Falls (Scaffolding, Ariel lifts, Ladders, Roof work)	<input type="checkbox"/> Inspect general ladder condition before use <input type="checkbox"/> Current Ladder inspections <input type="checkbox"/> Ladder tied off <input type="checkbox"/> Proper angle/placement of ladders <input type="checkbox"/> Proper ladder size <input type="checkbox"/> 100% Tie Off of tools from lifts/scaffolds <input type="checkbox"/> Scaffold User Inspection before use <input type="checkbox"/> Competent Person Inspection of Scaffold <input type="checkbox"/> Fall Protection Plan <input type="checkbox"/> Roof Assessment	<input checked="" type="checkbox"/> Gloves <input checked="" type="checkbox"/> Silver Shield <input type="checkbox"/> Canvas <input type="checkbox"/> Latex <input type="checkbox"/> Nitrile <input type="checkbox"/> PVC <input type="checkbox"/> Neoprene <input type="checkbox"/> Chemical Resistant Gloves <input type="checkbox"/> Specify: _____ See IS-5
<input type="checkbox"/> Moving/Falling objects from height	<input type="checkbox"/> Tether small objects <input type="checkbox"/> Use rope, canvas bag <input type="checkbox"/> Barricade around potential fall area <input type="checkbox"/> Barricade tape <input type="checkbox"/> Hard hats <input type="checkbox"/> Tie off tools/materials <input type="checkbox"/> Warning signs <input type="checkbox"/> Cover over opening <input type="checkbox"/> Rigid railing required	<input type="checkbox"/> Insulated Gloves <input type="checkbox"/> Vibration Dampening <input checked="" type="checkbox"/> Leather Gloves <input type="checkbox"/> Rubber Gloves <input type="checkbox"/> Voltage Rated Gloves NFPA-70 <input type="checkbox"/> Other: _____ See CEHA & Table 1
<input type="checkbox"/> Excavations	<input type="checkbox"/> Excavation/Shoring Permit <input type="checkbox"/> Inspect prior to entering <input type="checkbox"/> Competent Person Inspection <input type="checkbox"/> Proper sloping/shoring <input type="checkbox"/> Access/egress provided <input type="checkbox"/> Scans <input type="checkbox"/> Barricades	<input type="checkbox"/> Insulated Gloves <input type="checkbox"/> Vibration Dampening <input checked="" type="checkbox"/> Leather Gloves <input type="checkbox"/> Rubber Gloves <input type="checkbox"/> Voltage Rated Gloves NFPA-70 <input type="checkbox"/> Other: _____ See CEHA & Table 1
<input type="checkbox"/> Underground Utilities (Line Locating)	<input type="checkbox"/> Reviewed ground scans <input type="checkbox"/> Received excavation permit <input type="checkbox"/> Maintain clearance distance <input type="checkbox"/> Safe work zone marked <input type="checkbox"/> Insulated hand tools	<input type="checkbox"/> Insulated Gloves <input type="checkbox"/> Vibration Dampening <input checked="" type="checkbox"/> Leather Gloves <input type="checkbox"/> Rubber Gloves <input type="checkbox"/> Voltage Rated Gloves NFPA-70 <input type="checkbox"/> Other: _____ See CEHA & Table 1
<input type="checkbox"/> Fire Hazard, weld, burn, grind, solder	<input type="checkbox"/> Fire Extinguishers <input type="checkbox"/> Fire Watch <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Adjacent area protected <input type="checkbox"/> Unnecessary flammable material removed <input type="checkbox"/> Hot Work Permit	<input type="checkbox"/> Insulated Gloves <input type="checkbox"/> Vibration Dampening <input checked="" type="checkbox"/> Leather Gloves <input type="checkbox"/> Rubber Gloves <input type="checkbox"/> Voltage Rated Gloves NFPA-70 <input type="checkbox"/> Other: _____ See CEHA & Table 1
<input type="checkbox"/> Noise > 85 dBA	<input type="checkbox"/> Hearing protection <input type="checkbox"/> Noise monitoring (IH)	<input checked="" type="checkbox"/> Foot Protection
<input type="checkbox"/> High Energy Air/Steam/Fluid > 500 PSI or > 200 degrees	<input type="checkbox"/> Depressurize <input type="checkbox"/> PPE <input type="checkbox"/> Whip Check Tie-downs <input type="checkbox"/> Cool down systems <input type="checkbox"/> Lock Out/Tag Out	<input checked="" type="checkbox"/> Protective footwear w/ankle support <input type="checkbox"/> Substantial footwear <input type="checkbox"/> Rubber Boots <input type="checkbox"/> Rubber Boots cover <input type="checkbox"/> Dielectric Footwear <input type="checkbox"/> Chemical Resistant Footwear <input type="checkbox"/> Other: _____
<input type="checkbox"/> Stored Energy	<input type="checkbox"/> Lock Out/Tag Out <input type="checkbox"/> Remove energy <input type="checkbox"/> PPE	<input type="checkbox"/> Substantial footwear <input type="checkbox"/> Rubber Boots <input type="checkbox"/> Rubber Boots cover <input type="checkbox"/> Dielectric Footwear <input type="checkbox"/> Chemical Resistant Footwear <input type="checkbox"/> Other: _____
<input type="checkbox"/> Rotating/Moving Equipment or Pinch points	<input type="checkbox"/> Lock Out/Tag Out <input type="checkbox"/> Machine guards in place <input type="checkbox"/> Block parts against motion <input type="checkbox"/> PPE <input type="checkbox"/> Hand/Body position <input type="checkbox"/> Remove Loose clothing	<input type="checkbox"/> Substantial footwear <input type="checkbox"/> Rubber Boots <input type="checkbox"/> Rubber Boots cover <input type="checkbox"/> Dielectric Footwear <input type="checkbox"/> Chemical Resistant Footwear <input type="checkbox"/> Other: _____

Job/Task No.:

Date:

Replace SX HEPA Filters

**WORKSITE HAZARD ANALYSIS (continued)**

047608

Hazards (continued)	Possible Controls (continued)	Applicable PPE (continued)
<input type="checkbox"/> Working With Chemicals (Examples: Lead, Beryllium, Asbestos, Acids, Bases, Paints, Glues, Solvents)	<input type="checkbox"/> Obtain MSDS and review controls <input type="checkbox"/> Have proper containers & labels <input type="checkbox"/> PPE <input type="checkbox"/> Fume Hoods, Glove boxes, etc. <input type="checkbox"/> Safety Showers identified <input type="checkbox"/> Eye wash station <input type="checkbox"/> Asbestos Work Permit <input type="checkbox"/> IH Monitoring Plan # _____ <input type="checkbox"/> Ventilation/Engineering Control	<input type="checkbox"/> Respiratory Protection <input type="checkbox"/> APR <input type="checkbox"/> PAPR <input type="checkbox"/> Airline <input type="checkbox"/> SCBA <input type="checkbox"/> Carri-Air <input type="checkbox"/> Specify Cartridges: _____
<input type="checkbox"/> Laboratory Hazards <input type="checkbox"/> Chemical Splashes <input type="checkbox"/> Chemical Compatibility <input type="checkbox"/> Reactive <input type="checkbox"/> Time Sensitive	<input type="checkbox"/> PPE <input type="checkbox"/> Chemical Segregation <input type="checkbox"/> Volume limitations <input type="checkbox"/> Special Labeling or postings <input type="checkbox"/> Fume Hoods	<input checked="" type="checkbox"/> Special Clothing <input type="checkbox"/> Tyvek <input type="checkbox"/> NFPA-70 Rated <input type="checkbox"/> Normex III <input type="checkbox"/> Rain Suit <input type="checkbox"/> Safety Vest <input type="checkbox"/> Silver Shield Apron, etc. <input checked="" type="checkbox"/> Other: <u>See Table 1</u>
<input type="checkbox"/> Pressurized Gas Cylinders	<input type="checkbox"/> Caps on while moving <input type="checkbox"/> Secured while moving or stored <input type="checkbox"/> Suitable lifting moving device	
<input type="checkbox"/> Potential Contact with Tank Waste	<input type="checkbox"/> Silver shield PPE (Gloves, hood, apron) <input type="checkbox"/> Respiratory protection	
<input type="checkbox"/> Confined Space	<input type="checkbox"/> Confined Space permit	
<input type="checkbox"/> Wall/Ceiling Penetration	<input type="checkbox"/> Scanned area where penetration will take place <input type="checkbox"/> Perform Walk Around	
<input checked="" type="checkbox"/> Radiological <input checked="" type="checkbox"/> Radiological Material <input checked="" type="checkbox"/> Radiological exposure <input checked="" type="checkbox"/> Radiological contamination <input type="checkbox"/> Loose or airborne contamination <input type="checkbox"/> Fixed contamination disturbed <input type="checkbox"/> Radiological generating device <input checked="" type="checkbox"/> Radiological system breached	<input checked="" type="checkbox"/> Radiological Work Permit # <u>CO-106 OR 469</u> <input type="checkbox"/> Radiological Screening process <input checked="" type="checkbox"/> ALARA Management Worksheet <input type="checkbox"/> Minimize <b>Time</b> in area (use of mockups, automated systems, etc.) <input type="checkbox"/> Maximize <b>Distance</b> to source of radiation (extension tools, remote operated equip., etc.) <input type="checkbox"/> Use of <b>Shielding</b> <input type="checkbox"/> Reduce item generating concern (contamination or radiation source) <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Contain source of contamination concern <input type="checkbox"/> Apply approved fixative	
<input type="checkbox"/> Flammable Gases	<input type="checkbox"/> Bonding <input type="checkbox"/> Intrinsically safe tools/equipment	
<input type="checkbox"/> Temperature Extremes <input type="checkbox"/> Heat Stress <input type="checkbox"/> Cold Stress	<input type="checkbox"/> Use Heat Stress Mitigation Checklist <input type="checkbox"/> Warming Hut <input type="checkbox"/> Frequency of Breaks	
<input checked="" type="checkbox"/> Tank Farm Vapors	<input checked="" type="checkbox"/> IH Monitoring and Sampling Plan # <u>See Other</u> <input checked="" type="checkbox"/> Temp. VCZ	
<input type="checkbox"/> Lack of Adequate Lighting	<input type="checkbox"/> Change work to daytime <input type="checkbox"/> Temporary lighting (Light stand or flashlight, etc.)	

Other:  
 VCZs can be downposted per Tank Farm Chemical Exposure Hazard Analysis 0108-302. SX-101 & 113 are on Table 1 list of tanks "not requiring silvershield PPE". IH Monitoring Plan is 7X100-JWJ-06-018.

**TANK FARM CHEMICAL EXPOSURE HAZARD ANALYSIS**  
**S-Complex - 5-VT-076 Breather Filter /5-VT-710 Radial Filter Replacement,**  
**January 23, 2008**

0108-302

**Summary:**

The vapor control zones in S-Complex can be temporarily down posted for work activity associated with 5-VT-076 Breather Filter /5-VT-710 Radial Filter Replacement based upon the following hazard assessment as per TFC-ESHQ-S\_IH-CD-35 REV C-2, Managing Vapor Control Zones.

**Work Activity/Task:**

1. The work activities are detailed in 5-VT-076 Breather Filter Replacement.
2. The work activities are detailed in 5-VT-710 Radial Filter Replacement.
3. The work activities do not require waste-disturbing activities.

**Comparable Activities:**

1. Personal air sampling at S-Complex farms vapor sources showed no exposure measurements approaching 10% of the S-Complex Chemicals of Potential Concern. 7X100-JWJ-07-006. Results of Personal Air Sampling Conducted in S-Complex Tank Farms from November 2004-October 2006.
2. Review of air sampling and monitoring data up to 01/20/08 in S-Complex farms showed no exposure measurements approaching 10% of the S-Complex Chemicals of Potential Concern.

**Hazard Identification:**

1. The hazardous gases and vapors potentially generated in the S-Complex Tank Farms waste tanks were identified in RPP-22491, Industrial Hygiene Chemical Vapor Technical Basis.
2. The hazardous gases and vapors potentially generated in the S-Complex Tank Farms waste tanks during non-waste disturbing activities were identified during S-Complex Chemicals of Potential Concern Characterization air sampling.
3. The COPC Chemicals identified in S-Complex Tank Farms were ammonia, nitrous oxide, and nitrosamines.

**Data Review:**

1. Personal air sampling results for representative work activities conducted in S Complex tank farms from 11/04 – 10/06 showed no COPC exceeded 10% of the Tank Farm Occupational Exposure Limits. 7X100-JWJ-07-006. Results of Personal Air Sampling Conducted in S-Complex Tank Farms from November 2004-October 2006.
2. S-Complex COPC air sampling showed that no COPC exceeded 50% of the Tank Farm occupational exposure limit in the work areas, 5 ft from any recognized vapor source.

(EHA)

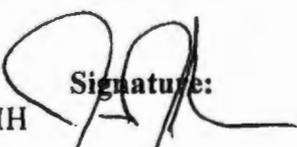
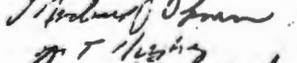
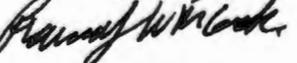
**TANK FARM CHEMICAL EXPOSURE HAZARD ANALYSIS**  
**S-Complex - 5-VT-076 Breather Filter / 5-VT-710 Radial Filter Replacement,**  
**January 23, 2008**

0108-302

3. Review of air sampling and monitoring data up to 01/20/07 in S-Complex showed no exposure measurements approaching 10% of the S-Complex Chemicals of Potential Concern.
4. Comparison of the TWINS headspace data between C-103 and S-Complex tanks showed that no COPC's in S-Complex tanks differed by a factor of 4.

**Vapor Hazard Controls:**

1. The IHT will conduct air sampling and monitoring as per as per 7X100-JWJ-06-018, Monitoring and Sampling Plan for S, SX and SY-Farm Work Activities.
2. If IHT monitoring detects ammonia concentrations exceeding the Tank Farm Chemical Action Limit of 15 ppm in the work area during the operation, the work will be paused and the workers placed in a safe configuration and the issue is resolved before the work proceeds. If area ammonia levels remain above the chemical action limits for 15 minutes, a vapor control zone will be reestablished around the filters.

<b>Title:</b>	<b>Name:</b>	<b>Signature:</b>	<b>Date:</b>	<b>Phone:</b>
Industrial Hygienist:	J.W. Jabara, CIH		1/24/08	373-1385
IH Reviewer:	M.L. Zobel		1/24/08	376-0162
IH Manager:	M. T. Hughey		1-24-08	373-2874
Operations Manager:	R.W. Cook		1/24/08	372-1450

# MATERIAL SAFETY DATA SHEET: SIMPLE GREEN®

also for : SIMPLE GREEN® SCRUBBING PAD

## I. PRODUCT & COMPANY INFORMATION

Version No. 10012  
Issue Date: January 2008

PRODUCT NAME: SIMPLE GREEN® ALL-PURPOSE CLEANER  
SIMPLE GREEN® CONCENTRATED CLEANER / DEGREASER / DEODORIZER  
SIMPLE GREEN® SCRUBBING PAD

Page 1 of 4

COMPANY NAME: SUNSHINE MAKERS, INC.  
15922 Pacific Coast Highway  
Huntington Harbour, CA 92649 USA  
Telephone: 800-228-0709 • 562-795-8000  
Fax: 562-592-3034  
Website: www.simplegreen.com

MSDS # 012261

For 24-hour emergency, call Chem-Tel, Inc.: 800-255-3924

USE OF PRODUCT: An all purpose cleaner and degreaser used diluted in water for direct, spray, and dip tank procedures. (Scrubbing pad is used with water for manual scrubbing applications.)

## II. INGREDIENT INFORMATION

The only ingredient of Simple Green® with established exposure limits is undiluted 2-butoxyethanol (<6%) (Butyl Cellosolve; CAS No. 111-76-2): the ACGIH TLV-TWA is 20 ppm (97 mg/m<sup>3</sup>).

Based upon chemical analysis, Simple Green® contains no known EPA priority pollutants, heavy metals, or chemicals listed under RCRA, CERCLA, or CWA. Analysis by TCLP (Toxicity Characteristic Leaching Procedure) according to RCRA revealed no toxic organic or inorganic constituents.

All components of Simple Green® are listed on the TSCA Chemical Substance Inventory.

## III. HAZARDS IDENTIFICATION

UN Number: Not required  
Dangerous Goods Class: Nonhazardous

NJ TRADE SECRET REGISTRATION NUMBERS	
80100235-5000p	80100235-5005p
80100235-5001p	80100235-5006p
80100235-5002p	80100235-5007p
80100235-5003p	80100235-5008p
80100235-5004p	80100235-5009p

### Hazard Rating (NFPA/HMIS)

Health = 1\*      Reactivity = 0  
Fire = 0          Special = 0



### Rating Scale

0 = minimal      1 = slight  
2 = moderate    3 = serious  
4 = severe

\*Mild eye irritant, non-mutagenic and non-carcinogenic. None of the ingredients in Simple Green® are regulated or listed as cancer agents by Federal OSHA, NTP, or IARC.

**IV. FIRST AID MEASURES****SYMPTOMS OF OVEREXPOSURE AND FIRST AID TREATMENT**

- Eye contact:** Reddening may develop. Immediately rinse the eye with large quantities of cool water; continue 10-15 minutes or until the material has been removed; be sure to remove contact lenses, if present, and to lift upper and lower lids during rinsing. Get medical attention if irritation persists.
- Skin contact:** Minimal effects, if any; rinse skin with water, rinse shoes and launder clothing before reuse. Reversible reddening may occur in some dermal-sensitive users; thoroughly rinse area and get medical attention if reaction persists.
- Swallowing:** Essentially non-toxic. Give several glasses of water to dilute; do not induce vomiting. If stomach upset occurs, consult physician.
- Inhalation:** Non-toxic. Exposures to concentrate-mist may cause mild irritation of nasal passages or throat; remove to fresh air. Get medical attention if irritation persists.

**V. FIRE FIGHTING MEASURES**

Simple Green® is stable, not flammable, and will not burn.

- |                                   |   |                      |
|-----------------------------------|---|----------------------|
| Flash Point/Auto-Ignition:        | Not flammable.  | <b>MSDS # 012261</b> |
| Flammability Limits:              | Not flammable.  |                      |
| Extinguishing Media:              | Not flammable/nonexplosive. No special procedures required. |                      |
| Special Fire Fighting Procedures: | None required.  |                      |

**VI. ACCIDENTAL RELEASE MEASURES**

Recover usable material by convenient method; residual may be removed by wipe or wet mop. If necessary, unrecoverable material may be washed to drain with large quantities of water.

**VII. HANDLING, STORAGE & TRANSPORT INFORMATION**

No special precautions are required. This product is non-hazardous for storage and transport according to the U.S. Department of Transportation Regulations. Simple Green® requires no special labeling or placarding to meet U.S. Department of Transportation requirements.

UN Number: Not required

Dangerous Goods Class: Non-hazardous

**VIII. EXPOSURE CONTROLS**

**Exposure Limits:** The Simple Green® formulation presents no health hazards to the user when used according to label directions for its intended purposes. Mild skin and eye irritation is possible (please see Eye contact and Skin contact in Section IV.).

**Ventilation:** No special ventilation is required during use.

**Human Health Effects or Risks from Exposure:** Adverse effects on human health are not expected from Simple Green®, based upon twenty years of use without reported adverse health incidence in diverse population groups, including extensive use by inmates of U.S. Federal prisons in cleaning operations.

Simple Green® is a mild eye irritant; mucous membranes may become irritated by concentrate-mist.

Simple Green® is not likely to irritate the skin in the majority of users. Repeated daily application to the skin without rinsing, or continuous contact of Simple Green® on the skin may lead to temporary, but reversible, irritation.

**Medical Conditions Aggravated by Exposure:** No aggravation of existing medical conditions is expected; dermal sensitive users may react to dermal contact by Simple Green®.

**IX. PERSONAL PROTECTION**

<b>Precautionary Measures:</b>	No special requirements under normal use conditions.
<b>Eye Protection:</b>	<b>Caution, including reasonable eye protection, should always be used to avoid eye contact where splashing may occur.</b>
<b>Skin Protection:</b>	No special precautions required; rinse completely from skin after contact.
<b>Respiratory Protection:</b>	No special precautions required.
<b>Work and Hygienic Practices:</b>	No special requirements. Wash or rinse hands before touching eyes or contact lenses.

**X. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance/odor:</b>	Translucent green liquid with characteristic sassafras odor. (Scrubber is green fibrous rectangle.)		
<b>Specific Gravity:</b>	1.0257	<b>Vapor Pressure:</b>	17 mm Hg @ 20 °C; 22 mm Hg @ 25 °C
<b>pH of concentrate:</b>	9.5	<b>Vapor Density:</b>	1.3 (air = 1)
<b>Evaporation:</b>	>1 (butyl acetate = 1)	<b>Density:</b>	8.5 lbs./gallon
<b>Boiling Point:</b>	110 °C (231 °F)		
<b>Freezing Point:</b>	-9 °C (16 °F) If product freezes, it will reconstitute without loss of efficacy when brought back to room temperature and agitated.		

**VOC Composite Partial Pressure:** 0.006 mm Hg @ 20 °C

**Volatile Organic Compounds (VOCs):** 7.96 g/L per ASTM Method 3960-90. Per EPA Method 24, VOCs are 5.9% and product must be diluted at least 1 part of water to 1 part Simple Green® in order to meet CARB 2005 VOC regulations -or 1 part Simple Green to 3 parts water to meet SCAQMD Rule 1171 & Rule 1122 and BAAQMD Regulation 8-16 VOC requirements for solvent cleaning operations.

**Water Solubility:** Completely soluble in water. The higher salt concentrations in marine ecosystems will lead to complexes with Simple Green® that may become visible at ratios above one part Simple Green® to 99 parts seawater.

**Ash Content:** At 600 °F: 1.86% by weight.

**Nutrient Content:** Nitrogen: <1.0% by weight (fusion and qualitative test for ammonia).  
Phosphorus: 0.3% by formula.  
Sulfur: 0.6% by weight (barium chloride precipitation method).

**Detection:** Simple Green® has a characteristic sassafras odor that is not indicative of any hazardous situation.

**XI. STABILITY AND REACTIVITY INFORMATION**

Nonreactive. Simple Green® is stable, even under fire conditions, and will not react with water or oxidizers. Hazardous polymerization will not occur.

**XII. TOXICOLOGICAL INFORMATION****Nonhuman Toxicity****Acute Mortality Studies:**

Oral LD<sub>50</sub> (rat): >5.0 g/kg body weight // Dermal LD<sub>50</sub> (rabbit): >2.0 g/kg body weight

**Dermal Irritation:** Only mild, but reversible, irritation was found in a standard 72-hr test on rabbits. A value of 0.2 (non-irritating) was found on a scale of 8.

**Eye Irritation:** With or without rinsing with water, the irritation scores in rabbits at 24 hours did not exceed 15 (mild irritant) on a scale of 110.

**Subchronic dermal effects:** No adverse effects, except reversible dermal irritation, were found in rabbits exposed to Simple Green® (up to 2.0 g/kg/day for 13 weeks) applied to the skin of 25 males and 25 females. Only female body weight gain was affected. Detailed microscopic examination of all major tissues showed no adverse changes.

**Fertility Assessment by Continuous Breeding:** The Simple Green® formulation had no adverse effect on fertility and reproduction in CD-1 mice with continuous administration for 18 weeks, and had no adverse effect on the reproductive performance of their offspring.

**XIII. BIODEGRADABILITY AND ENVIRONMENTAL TOXICITY INFORMATION****Biodegradability:**

Simple Green® is readily decomposed by naturally occurring microorganisms. The biological oxygen demand (BOD), as a percentage of the chemical oxygen demand (COD), after 4, 7, and 11 days was 56%, 60%, and 70%, respectively. Per OECD Closed Bottle Test, Simple Green® meets OECD and EPA recommendations for ready biodegradability. In a standard biodegradation test with soils from three different countries, Butyl Cellosolve reached 50% degradation in 6 to 23 days, depending upon soil type, and exceeded the rate of degradation for glucose which was used as a control for comparison.

**Environmental Toxicity Information:**

Simple Green® is considered practically non-toxic per EPA's aquatic toxicity scale. Simple Green® is non-lethal to any of the marine and estuarine test animals listed in the following table at concentrations below 200 mg/L (0.02%). This table shows the Simple Green® concentrations that are likely to be lethal to 50% of the exposed organisms.

	LC <sub>50</sub> in mg/L (ppm)	
	48-hour	96-hour
<b>Marine Fish:</b>		
Mud minnow ( <i>Fundulus heteroclitus</i> )	1690	1574
Whitebait ( <i>Galaxias maculatus</i> )	210	210
<b>Marine/Estuarine Invertebrates:</b>		
Brine Shrimp ( <i>Artemia salina</i> )	610	399
Grass Shrimp ( <i>Palaemonetes pugio</i> )	270	220
Green-lipped Mussel ( <i>Perna canaliculus</i> )	220	220
Mud Snail ( <i>Potamopyrgus estuarinus</i> )	410	350

MSDS # 012261

**XIV. DISPOSAL CONSIDERATIONS**

Simple Green® is fully water soluble and biodegradable and will not harm sewage-treatment microorganisms if disposal by sewer or drain is necessary. Dispose of in accordance with all applicable local, state, and federal laws.

**XV. OTHER INFORMATION**

**Containers:** Simple Green® residues can be completely removed by rinsing with water; the container may be recycled or applied to other uses.

**Electrical Wiring Compatibility:** Polyimide insulated wiring is not affected by exposure to Simple Green®. After immersion in Simple Green® for 14 days at 74°F, the 61 cm piece of polyamide insulated wire passed a one minute dielectric proof test at 2500 volts (ASTM D-149).

**Contact Point:** Sunshine Makers, Inc., Research and Development Division: 562-795-6000.

**National Stock Numbers:**

PART#	NSN	SIZE	PART#	NSN	SIZE
13012	7930-01-342-5315	24 oz. spray (12/cs)	13016	7930-01-342-5317	15 gal.
13005	7930-01-308-8389	1 gal. (6/cs)	13008	7930-01-342-4145	55 gal.
13006	7930-01-342-5318	5 gal.	Scrubbing Pad: 10224	7930-01-348-9148	Each (24/cs)

**\*\*\* NOTICE \*\*\***

All information appearing herein is based upon data obtained by the manufacturer & recognized technical sources. Judgments as to the suitability of information herein for purchaser's purposes are necessarily purchaser's responsibility. Therefore, although reasonable care has been taken in the preparation of this information, Sunshine Makers, Inc. or its distributors extends no warranties, makes no representations and assumes no responsibility as to the suitability of such information for application to purchaser's intended purposes or for consequences of its use.

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**Tank Farm Maintenance Procedure**

**MAINTENANCE**



Double click to change COPY type

**Radial HEPA Filter Installation, Removal, & Replacement**

**PCA Incorporated:** TF-2008-0487  
**Procedure Signatures for:** 5-VT-710 B-0  
**Type of Change:** IDMS Periodic Review process/PCA  
**Review Designator:** S  
**USQ Screening Number:** TF-08-0060-D, Rev 1

POSITION/ORG	DELEGATE	DATE
Millwright/Maint	<u>Charles L. Lumpkin</u>	<u>03/19/2008</u>
Retrieval Safety	<u>M. T. Hughey</u>	<u>03/12/2008</u>
FWS/Maintenance	<u>Anthony R. Thomas</u>	<u>03/17/2008</u>
Vent/Sys Eng	<u>Greg Gauck</u>	<u>03/28/2008</u>
Technical Writer	<u>S. E. Bevans</u>	<u>03/31/2008</u>
Approval Authority	<u>R. P. Tucker</u>	<u>03/28/2008</u>

**Justification:**

IDMS Periodic Review process

**Summary of Changes:**

Format updates and identifies changes

**Next Periodic Review Date - 03/31/2012**

The following organization(s) have determined their need to review this procedure at the next periodic review cycle: Technical Authority, Safety, Environmental, and Radiological Control.

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## 1.0 PURPOSE AND SCOPE

### 1.1 Purpose

This procedure provides instructions for removal, installation, and disposal of Radial breather filter on Breather Filter assembly/riser at 241-AZ154, 241-U-301-B, 241-UX-302-A, 244-A catch tank, 244-A catch tank annulus space, 241-ER-311 and the 149 Single Shell Tanks stated in the Radioactive Air Emissions Notice of Construction for Categorical Tank Farm Facility Waste Retrieval and Closure: Phase I Site preparation and system installation.

### 1.2 Scope

This procedure involves filters installed Breather Filter assemblies/risers.

This procedure may be used for installation or replacement of Radial filter(s).

Installation of filter(s) on:

- New Breather Filter assemblies
- New Breather Filter assembly housings

Replacement of filter(s) on:

- Existing Breather Filter assemblies
- Existing Breather Filter assembly housings.

## 2.0 INFORMATION

NONE

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### 3.0 PRECAUTIONS AND LIMITATIONS

#### 3.1 Personnel Safety

WARNING - Removed material should be treated as contaminated. Failure to do so may result in personnel contamination.

- 3.1.1 When there is a potential to contact condensate or tank waste from tanks not listed in Table 1 of TFC-ESHQ-S\_IS-C-02, Personal Protective Equipment, silver shield PPE is required.

#### 3.2 Equipment Safety

CAUTION - Too much twisting torque on the filter mesh material could cause it to crinkle and possibly puncture the filter material.

CAUTION - Cross-threading of filter threads may result in equipment failure.

#### 3.3 Radiation and Contamination Control

- 3.3.1 Work in radiological areas will be performed using a radiological work permit following review by Radiological Control per ALARA Work Planning procedure TFC-ESHQ-RP\_RWP-C-03.
- 3.3.2 The opening of any system or component within a Radiological Area requires the presence of a Health Physics Technician to verify radiological conditions are within RWP limits.
- 3.3.3 All removed materials, liquids, spent cleaning materials and used filter(s) should be treated as contaminated until proven non-contaminated by radiological survey.

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### 3.4 Environmental Compliance

- 3.4.1 All materials are to be managed in accordance with Waste Planning Checklist and TO-100-052.
- 3.4.2 Ensure Waste Planning Checklist is included in work package.
- 3.4.3 The following requirements from TFC-ESHQ-ENV-STD-06 Section 3.3.1 must be met:
1. Do not open pits or risers if sustained winds are greater than 25 mph.
    - A local wind speed measurement device may be used in lieu of Hanford Meteorological Station readings, provided the reading is taken in an unobstructed location that is representative of the work area.
    - Use of a local device and the measured wind speed readings taken from it must be documented in the Work Management System Work Record.
  2. Minimize open riser time using valves, caps, adapters, or plugs as appropriate.
  3. HPT coverage will be performed as specified in the Radiological Work Permit.
  4. Equipment is decontaminated or contained when removed from tanks.
    - Equipment is decontaminated or contained when removed from tanks when >50,000 dpm/100 cm<sup>2</sup> beta/gamma and/or >70 dpm/100 cm<sup>2</sup> alpha.
    - Swipes will be taken to determine that the surface of the item or the outermost surface of the container are maintained <50,000 dpm/100 cm<sup>2</sup> beta/gamma and/or <70 dpm/100 cm<sup>2</sup> alpha.
    - Containments used during the work must be in accordance with TFC-ESHQ-RP\_RWP-C-02 latest revision, Attachment A, Containment Selection Guide.
  5. Pre-job and post-job surveys (smears) shall be taken.
- 3.4.4 Immediately report any spills or releases to Environmental Compliance per the Environmental Compliance On-Call List in accordance with procedure TFC-ESHQ-ENV\_FS-C-01. This includes any water discharge to surface contamination areas.

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### 3.4 Environmental Compliance (Cont.)

3.4.5 Tank Farm Contractor (TFC) Environmental representative and Tank Farm Shift Operations Facility shall be notified in accordance with TFC-ESHQ-ENV\_FS-C-01, Environmental Notifications if:

- The initial field count of an air sample with beta-gamma activity is greater than 0.2 Derived Air Concentration (DAC) and/or
- The initial field count of an air sample with total alpha activity is greater than 5.0 DAC and/or
- Results of 7-day decay count of air samples with a total alpha activity is greater than 0.2 DAC.

Elevated workspace air samples that are suspected to be radon or its daughter products are to be reported to the Environmental On-Call list within 24 hours of field count if radon is NOT confirmed. If the sample decay rate is indicative of radon, whether or not the sample remains above 5 DAC alpha within the 24 hour verification period, notification to the Environmental On-Call list is NOT required. If the decay rate is not indicative of radon, the Environmental On-Call person MUST be notified.

### 3.5 Limits

#### RPP-11413, Technical Basis for Ventilation System Requirements

- Ventilation System Operation and Filtration

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## 4.0 PREREQUISITES

### 4.1 Special Tools, Equipment, and Supplies

The following equipment and materials may be needed to perform this procedure:

- Radial HEPA Filters
- Threaded PVC cap for removed Radial breather filter
- Pipe wrench to fit 1 ½ inch pipe
- Non-regulated anti thread galling material (i.e., Gray Teflon Tape)
- Waste container
- Other tools, equipment and supplies as identified by Shift Manager/OE/FLM/User.

### 4.2 Filter Performance Documents

The following documents will be needed to complete this procedure:

- Applicable filter(s) Installation/Replacement Data Sheet
- Additional copies of Data Sheet 1 for each new filter to be installed.

The following documents may be needed during performance this procedure:

- A-6003-180 Temporary Shielding Authorization Form
- TFC-ESHQ-S\_IS-C-02, Personal Protective Equipment.
- TFC-OPS-MAINT-C-02, Pre-Job Briefing
- TO-100-052, Perform Waste Generation, Segregation, and Accumulation
- Waste Planning Checklist.

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**4.3 Field Preparation**

- 4.3.1 **NOTIFY** Quality Control of filter(s) installation/replacement task, for verification and inspection of replacement filter(s).
- 4.3.2 **ENSURE** pre-job safety briefing, including all involved personnel, per TFC-OPS-MAINT-C-02 has been completed.
- 4.3.3 **IF** Radiation Controls Planning has determined temporary shielding is necessary, **ENSURE** a Temporary Shielding Authorization form (A-6003-180) has been completed.
- 4.3.4 Entries into vapor control zones require SCBA unless alternative controls have been established through a job specific Tank Farm Chemical Exposure Hazard Analysis.

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## 5.0 PROCEDURE

NOTE - Component numbers are prefixed by various combinations of letters and number to designate the facility where the filter is installed (i.e., "B201-WST-").

- During performance of this procedure, tools, equipment and fittings will be removed from and/or inserted into the filter(s) housing. Such items shall be surveyed for radiological contamination prior to and after insertion/removal.
- If performance of any section is not necessary, N/A applicable Data Sheets.

### 5.1 Pre-Installation Filter QC Inspection and Data Recording

NOTE - This section only applies to new filters.

5.1.1 Quality Control Representative, **PERFORM** the following Sub-Steps.

5.1.1.1 **COMPLETE** inspection per Data Sheet 1.

5.1.1.2 **IF** filter does not pass visual inspection, **REQUEST** System Engineer to identify corrective action(s).

5.1.1.3 **IF** filter passes visual inspection, **INITIAL AND DATE** Data Sheet 1.

5.1.2 **DELIVER** filter(s) in its carton and bags to work area.

5.1.3 **IF** existing filter is being replaced, **GO TO** Section 5.2 to remove existing filter(s).

5.1.4 **IF** no filter is currently installed in housing, **GO TO** Section 5.3 to install new filter(s).

## 5.2 Remove Old Filter(s)

NOTE - This section applies only to the removal of existing filters. For installation of new filters see Section 5.3.

- Figure 1 shows the typical layout of a Radial breather filter assembly on a riser.

5.2.1 **PERFORM** pre-job contamination and radiation surveys of the work area  
**AND**

**RECORD** on Data Sheet 2.

5.2.2 **INSTALL** ground cover.

5.2.3 **IF** flammable gas reading was not taken, **RECORD** in comments section of Data Sheet 3.

5.2.4 **OBTAIN** Shift Manager Permission to close breather filter isolation valve.

NOTE - Valve handle is normally positioned 90 degrees from inlet pipe when closed. The closed position is determined by feeling the valve disc interacting with the valve seat.

5.2.5 **REQUEST** Operations personnel to **ENSURE** filter isolation valve is **CLOSED**.

5.2.6 **CONFIRM** filter isolation valve is **CLOSED**.

5.2.7 **DURING** the entire performance of this procedure, **INSPECT** filter assembly per Data Sheet 3 for discrepancies (i.e., bent/rusted, deformation of the housing, fasteners, gaskets, labels, etc.).

5.2.8 **IF** discrepancies are found, **RECORD** discrepancies in comment section on Data Sheet 3.

5.2.9 **START** work place air sampler.

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## 5.2 Remove Old Filter(s) (Cont.)

### CAUTION

Too much twisting torque on the filter mesh material could cause it to crinkle and possibly puncture the filter material.

5.2.10 **UNSCREW** wing-nut **AND REMOVE** weather cover (keep both for later use).

NOTE - Removing the bird screen from the filter assembly will allow access to the threaded pipe nipple.

5.2.11 **CAREFULLY LIFT** bird screen off filter assembly (keep for later use).

NOTE - A PVC threaded pipe cap can used for additional contamination control and may be optionally used at the discretion of the FWS and HPT.

5.2.12 **IF** requested by FWS or HPT, **STAGE** threaded PVC cap.

### WARNING

Removed material should be treated as contaminated. Failure to do so may result in personnel contamination.

5.2.13 **USE** pipe wrench to loosen Radial breather filter pipe nipple.

5.2.14 **ENSURE** equipment being removed is decontaminated or contained, **AND MEETS** the following criteria at the outer-most surface of item or container:

- <50,000 dpm/100 cm<sup>2</sup> beta-gamma
- <70 dpm/100 cm<sup>2</sup> alpha.

**5.2 Remove Old Filter(s) (Cont.)**

- 5.2.15 **CAREFULLY UNSCREW** contaminated Radial breather filter.
- 5.2.15.1 **UNTIL** radiological conditions have been confirmed, **CONTROL** breached opening with a wet rag.
- 5.2.15.2 **REQUEST** HPT to perform contamination survey of filter connection area, **AND**
- CONFIRM** levels are within RWP limits.
- 5.2.16 **IF** requested by FWS or HPT, **THREAD** PVC cap onto removed Radial breather filter.
- 5.2.17 **PLACE** filter in bag.
- 5.2.18 **SEAL** bag with Radial breather filter inside in accordance with Waste Planning Checklist and TO-100-052.
- 5.2.19 **CONFIRM** exterior contamination levels of bag are within RWP limits.
- 5.2.19.1 **IF** contamination levels of bag exterior are  $>50,000$  dpm/100 cm<sup>2</sup> beta-gamma or  $>70$  dpm/100 cm<sup>2</sup> alpha, **PLACE** into another bag (double bag).
- 5.2.20 **DISPOSE** of filter(s) in accordance with Waste Planning Checklist and TO-100-052.
- 5.2.21 **DURING** the entire performance of this procedure, **INSPECT** filter assembly per Data Sheet 3 for discrepancies (i.e., bent/rusted, deformation of the housing, fasteners, gaskets, labels, etc.).
- 5.2.22 **IF** discrepancies are found, **PERFORM** the following:
- 5.2.22.1 **COVER** riser opening.
- 5.2.22.2 **RECORD** discrepancies in comment section on Data Sheet 3.

### 5.3 Install New Filter(s)

NOTE - This Section only applies to new filter installations. For removal of existing filter(s) see Section 5.2.

5.3.1 **CONFIRM** Section 5.1 has been completed.

5.3.2 **ENSURE** the following items are available:

- New Filter
- Weather cover (new or saved from Step 5.2.10)
- Wing nut (new or saved from Step 5.2.10)
- Bird Screen (new or saved from Step 5.2.11).

5.3.3 **CONFIRM** pre-job contamination and radiation surveys have been performed and recorded on Data Sheet 2.

5.3.4 **ENSURE** ground cover is installed.

5.3.5 **DURING** the entire performance of this procedure, **INSPECT** filter assembly per Data Sheet 3 for discrepancies (i.e., bent/rusted, deformation of the housing, fasteners, gaskets, labels, etc.).

5.3.6 **IF** discrepancies are found, **RECORD** discrepancies in comment section on Data Sheet 3.

5.3.7 **ENSURE** work place air sampler is operating.

5.3.8 **PERFORM** radiation & contamination survey of housing interior, and exterior, and bird screen,

5.3.9 **DECONTAMINATE** surfaces as needed to  $<10,000$  dpm/100 cm<sup>2</sup> Beta-Gamma and  $<20$  dpm/100 cm<sup>2</sup> Alpha.

### 5.3 Install New Filter(s) (Cont.)

NOTE - See Figure 1 for filter replacement sketch.

5.3.10 **ENSURE** anti-galling material is applied to filter threads (i.e., Gray Teflon Tape).

#### CAUTION

**Cross-threading of filter threads may result in equipment failure.**

5.3.11 **USE** caution to ensure filter threads do not become cross-threaded, **AND CAREFULLY INSTALL** new Radial breather filter to hand-tightness.

5.3.12 **USE** pipe wrench **AND TIGHTEN** Radial breather filter pipe nipple.

5.3.13 **PERFORM** radiation & contamination survey of housing interior and exterior.

5.3.14 **DECONTAMINATE** surfaces as needed to  $<10,000$  dpm/100 cm<sup>2</sup> Beta-Gamma and  $<20$  dpm/100 cm<sup>2</sup> Alpha.

5.3.15 **INSTALL** bird screen over new Radial breather filter.

5.3.16 **WHILE** ensuring bird screen alignment up into the weather cover, **INSTALL** weather cover and wing nut.

NOTE - Valve handle normally aligns with inlet pipe when open.

5.3.17 **REQUEST** Operations personnel to **FULLY OPEN** filter isolation valve, and if valve is fitted with latching device, to ensure mechanical latch is used.

5.3.18 **INFORM** Shift Manager of valve status.

5.3.19 **STOP** work place air sampler.

5.3.20 **PERFORM** post-job contamination and radiation surveys of the work area, **AND**

**RECORD** on Data Sheet 2.

## 5.4 Restoration

- 5.4.1 IF old filter was removed, **TRANSFER** used filter(s) and absorbed liquid to Operations for disposal per Waste Planning Checklist and TO-100-052.
- 5.4.2 IF new filter(s) was installed, craftsmen **SIGN AND DATE** on Data Sheet 3 to indicate new filter(s) is successfully installed.

## 5.5 Acceptance Criteria

NOTE - This section only applies to new filter installations.

- 5.5.1 FWS/Lead **CONFIRM** Data Sheet 1, Data Sheet 2, and Data Sheet 3 entries are complete.
- 5.5.2 FWS/Lead **NOTIFY** Environmental Compliance, radial filter has been installed and the valve is open, **AND**  
**DOCUMENT** on Comment Page, Environmental representative contacted and date.

## 5.6 Review

- 5.6.1 FWS/Lead **NOTIFY** Shift Manager of equipment status (valve positions, and inspection results).
- 5.6.2 IF discrepancies were noted during inspection that may have contributed to failure of the filter(s), FWS **NOTIFY** System Engineer, **AND**  
**OBTAIN** concurrence to initiate a work package.
- 5.6.3 FWS/Lead **RECORD** on Data Sheet 4 any work request numbers generated during the performance of this procedure, **AND**  
**NOTIFY** System Engineer of any deficiencies.
- 5.6.4 FWS/Lead **SIGN AND DATE** Data Sheet 4.
- 5.6.5 FWS/Lead **INFORM** Shift Manager field work is complete.

## 5.7 Records

NOTE - The following records are generated during the performance of this procedure and are maintained in the CHAMPS work package as record material.

Record Description*	Vital Record Y/N	QA Record Y/N	QA Record Retention L/NP/NA	NARA Retention Schedule	Other Retention Requirements	Records Custodian
Data Sheet 1 through Data Sheet 4	N	Y	L	ADM-17.32A	N	Work Control Organization
Comment Page	N	Y	L	ADM-17.32A	N	Work Control Organization

\* The identified record custodian is responsible for record management in accordance with TFC-BSM-IRM\_DC-C-02 or other applicable requirements.

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Data Sheet 1 - QC Inspection Data

Radial HEPA Filter Change out QC Data Sheet*		
Filter component number where HEPA Filter will be Installed (i.e., B201-WST-FLT-101)	SEE DATA SHEETS IN	
Work Package Number	FOLDERS	
Date of Inspection	---	
Radial HEPA Filter (Record Information From Manufacturer's Label)		
Filter Manufacturer		
Model Number (identify letter designation of filter to indicate which drawing revision filter is fabricated to.)	O-007-1-12-RF-NU-00-E3-Z04059	
Serial Number		
HEPA Filter Flow Rating	N/A (CFM)	
HEPA Filter Resistance		
Manufacturer's Penetration Test Date		
Verify Filter Aerosol Penetration Has Been Tested by the Manufacturer and is No Greater than 0.03% at 100% of Rated Flow	SAT	UNSAT**
Seal (thread) Condition (No significant damage or cross threading, etc.)	SAT	UNSAT**
Comment: See work package C10-W0-08-0579 for SX101 Data sheet. See work package C10-W0-08-0580 for SX100 113 Data sheet. S.Doss 4-21-08		

\* Additional copies of this data sheet shall be made for each individual filter installed by this procedure.

\*\* Any UNSAT conditions found should be described on Comment Page, and the System Engineer should be notified.

QC Inspector: SEE SPECIFIC DATA SHEETS IN FOLDERS  
 Signature \_\_\_\_\_ Print Name \_\_\_\_\_ Date \_\_\_\_\_

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Data Sheet 2 - Daily Survey Data

Daily Survey Data Sheet*				
Condition	Number	Date	Time	Initials
Pre-Job contamination and radiation survey number:	N/A			
Post-Job contamination and radiation survey number:	N/A			
Comments: See work package CL0-W0-08-0579 for SX-101 Data Sheet. See work package CL0-W0-08-0580 for SX-113 Data Sheet. Stross 4-21-08				

\* Additional copies of this data sheet shall be made as needed by this procedure.

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Data Sheet 3 - Filter Installation Data

Radial HEPA Filter Change-out Data Sheet*		
Work Package Number		
Date of Installation	N/A	
Flammable Gas Concentration		IHT Initials and date
Record Filter EIN/Component Number (e.g., xxxx-VTP-FLT-001)		
<b>Inspect for:</b>	<b>SAT</b>	<b>UNSAT**</b>
No Damage to New HEPA Filter		
No Damage to Filter Weather Covers		
No Damage to Filter Threads		
No Damage to Bird Screen		
Bird Screen properly Installed (including alignment with weather cover)		
No Missing Fasteners	N/A	
No Missing Labels on Filter Assembly or Weather Covers		
Filter Isolation valve operates properly		
No Water In Filter		
No Visible Paint, Corrosion, or Other Foreign Objects In Filter Assembly		
New Filter Installed Properly with No Discrepancies		
Comment: See work package CLO-WO-08-0579 for SX-101 Data sheet See work package CLO-WO-08-0580 for SX-113 Data sheet SPASS 4-21-08		

- \* Additional copies of this data sheet shall be made for each individual filter installed by this procedure.
- \*\* Any UNSAT conditions found should be described on Comment Page, a PER should be generated by the FWS for all UNSAT conditions, a work request should be generated by the FWS for all UNSAT conditions to correct the problem, and the System Engineer should be notified.

Craftsman: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 Signature N/A Print Name Date

Craftsman: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 Signature Print Name Date

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Data Sheet 4 - FWS/Engineering/Environmental Review

PER Numbers Generated (if Applicable):		
N/A		
Work Request Numbers Generated (if Applicable):		
N/A		
FWS:		
Signature	Print Name	Date
Forward package to System Engineer for review and signature.		
System Engineer:		
Signature	Print Name	Date
N/A		
Forward package to Environmental for review and signature.		
Environmental:		
Signature	Print Name	Date
N/A		

See work package CLO WO-08-0579 for  
SX-101 Data Sheet.

See work package CLO-WO-08-0580 for  
SX-113 Data Sheet.

Sluss  
4-21-08

**Comment Page**

*(This page may be reproduced as necessary)*

Record below any comments encountered during performance of the procedure, and a description of any degraded conditions found and resulting actions taken. Also explain any UNSAT conditions described in Data Sheet 1 or Data Sheet 3

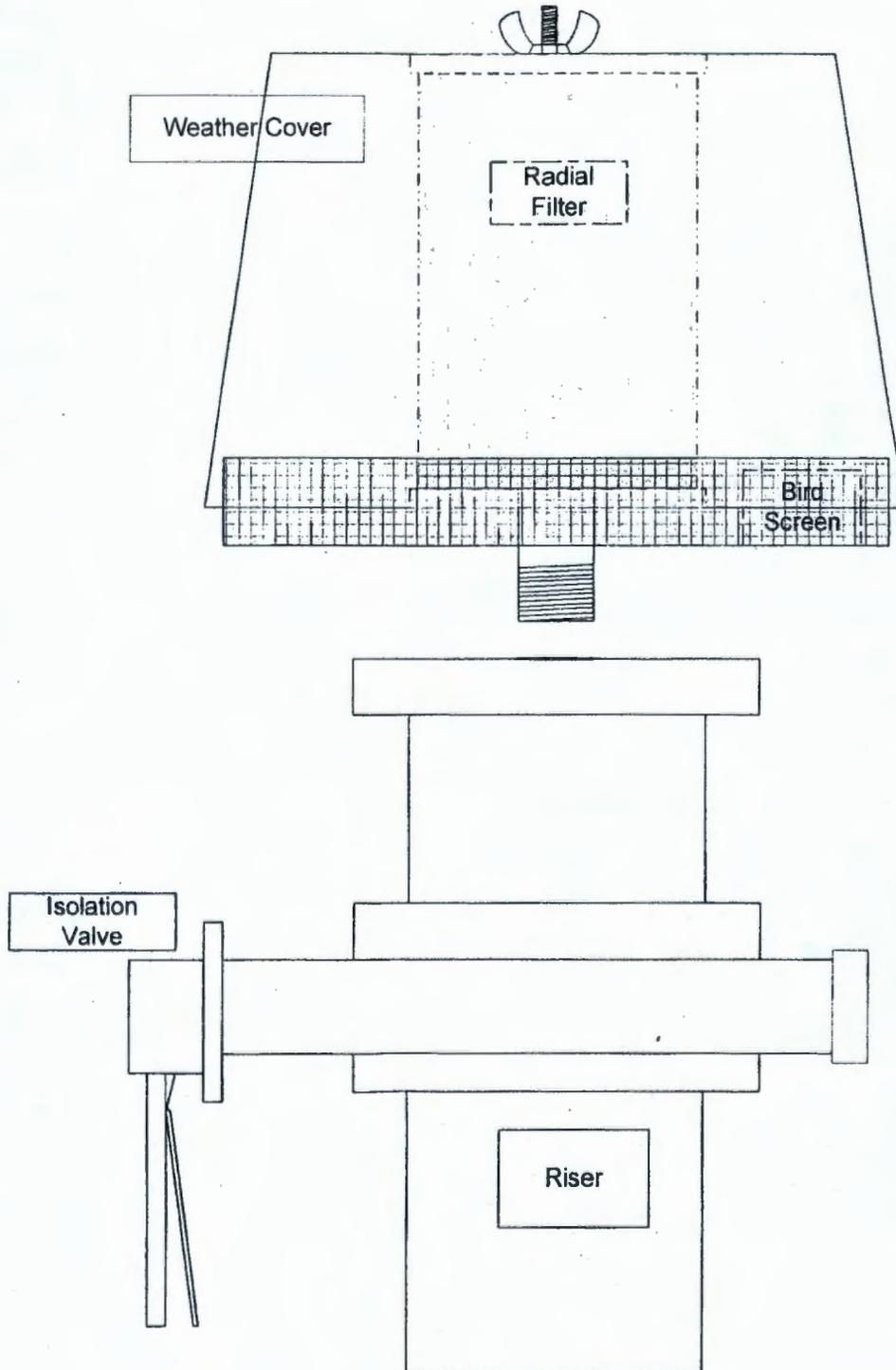
Date: 4-21-08

Data sheets 1, 2, 3, and 4 for SX-101 are contained in work package CLO-WO-08-0599.

Data sheets 1, 2, 3, and 4 for SX-113 are contained in work package CLO-WO-08-0580.

Stross  
4-21-08

Figure 1 - Flanders Filter Components



44

**CLO-WO-08-0563**  
**241-SX-101 REPLACE BREATHER FILTER WITH RADIAL FILTER**

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**1.0 SCOPE**

- [ ] 1.1. Replace the existing 241-SX-101 G-1 Breather Filter housing with new Radial Breather Filter Assembly 350 per ECN-725506 Rev 0.
- [ ] 1.2. The PM Work Order CLO-WO-08-0579 to install the new radial HEPA filter 241-SX-101 will be worked in conjunction with this work order.
  - This is a standard work order that is medium radiological risk.

**TASKS**

- [ ] 1.2.1. PREASSEMBLE the Radial Filter assembly and 4" valve into Assembly 350, H-2-90718 Sheet 25.
- [ ] 1.2.2. PERFORM the initial Radial Flow Breather Filter Assembly Post-Installation Inspection.
- [ ] 1.2.3. PERFORM pre-job contamination and radiation surveys of the work.
- [ ] 1.2.4. REMOVE the old Breather Filter assembly on Riser 18 at SX-101 from the valve up.
- [ ] 1.2.5. INSTALL the new Radial Filter Assembly with Butterfly Valve on Riser 18.
- [ ] 1.2.6. INSTALL a new HEPA filter on the new Radial Filter Assembly.
- [ ] 1.2.7. PERFORM post-job contamination and radiation surveys.
- [ ] 1.2.8. COMPLETE the Radial Flow Breather Filter Assembly Post-Installation Inspection Checklist.
- [ ] 1.2.9. DISPOSE of the old Breather Filter Housing.
- [ ] 1.2.10. CLEAN-UP Job Site.

*Notes 05-05-08 Scanned Changes: 93pgs. (Record from 600 of 06-06-08) DT-Clark*

**CLO-WO-08-0563**  
**241-SX-101 REPLACE BREATHER FILTER WITH RADIAL FILTER**

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**2.0 LIMITATIONS and PRECAUTIONS**

- [ ] 2.1. To ensure adequate contamination control and worker protection, at no time is it acceptable to breach systems containing radioactive materials without the use of engineering controls, respiratory protection and/or appropriate personal protective clothing. Approved engineered controls include: ventilation, containments, glovebags, sleeving, tents, glove boxes, fixatives, damp/dry rags and or spritzing methods. Deviation from this process requires approval by the applicable facility Radiological Control Director and the corresponding Line Management Director.
- [ ] 2.2. This work package will utilize radiological limits and controls specified in Radiation Work Permit RWP CO-469.
- [ ] 2.3. SX Farm has local Vapor Control Zones (VCZs) at the breather filters. VCZ can be downposted per the Tank Farm Chemical Exposure Hazard Analysis 0408-324.
- [ ] 2.4. Do not breach a radioactive system if sustained winds are > 25mph.
- A local wind speed measurement device may be utilized in lieu of Hanford Meteorological Station, provided the reading is taken in an unobstructed location that is representative of the work area.
  - Use of a local device and the measured wind speed must be documented in the Work Record (Ref. TFC-ESHQ-ENV-STD-06).
- [ ] 2.5. Equipment is decontaminated or contained when removed from tanks.
- Equipment is decontaminated or contained when removed from tanks when >50,000 dpm/100 cm<sup>2</sup> beta/gamma or > 70 dpm/100 cm<sup>2</sup> alpha.
  - Swipes will be taken to determine that the surface of the item or the outermost surface of the container are maintained <50,000 dpm/100 cm<sup>2</sup> beta/gamma and < 70 dpm/100 cm<sup>2</sup> alpha.

**CLO-WO-08-0563**  
**241-SX-101 REPLACE BREATHER FILTER WITH RADIAL FILTER**

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- [ ] 2.6. In the event of a spill of propylene glycol or water, notify Environmental On-Call in accordance with TFC-ESHQ-ENV\_FS-C-01, Environmental Notification.
- [ ] 2.7. FWS to prepare a route map of the vehicle and/or equipment routes and locations prior to entry into the tank farm.
- [ ] 2.8. No change to the dome load log is required. Removal of the old filter and replacement with a new Radial Filter assembly results in negligible weight change.
- [ ] 2.9. If the work directions and/or documents are confusing, conflicting, or not understood, contact FWS for clarification. If the work instructions/procedures are incorrect, request a change prior to proceeding. (Lessons Learned Bulletin # SN-98-09).
- [ ] 2.10. Tank Farm Contractors (TFC) Environmental representative and Tank Farm Shift Operations Facility shall be notified, in accordance with TFC-ESHQ-ENV\_FS-C-01, Environmental Notification, if:
- The initial field count of an air sample with a Beta-Gamma activity is greater than 0.2 DAC and/or
  - The initial field count of an air sample with Alpha activity is greater than 5.0 DAC and/or
  - A result of a 7 day decay count of air samples with a total Alpha activity is greater than 0.2 DAC.

Elevated workspace air samples that are suspected to be radon or its daughter products are to be reported to the Environmental On-Call list within 24 hours of field count if radon is **NOT** confirmed. If the sample decay rate is indicative of radon, whether or not the sample remains above 5 DAC alpha within the 24 hour verification period, notification to the Environmental On-Call list is **NOT** required. If the decay rate is not indicative of radon, the Environmental On-Call person **MUST** be notified.

**CLO-WO-08-0563**  
**241-SX-101 REPLACE BREATHER FILTER WITH RADIAL FILTER**

**3.0 PREREQUISITES**

**NOTE:**

Work steps within Section 3.0 "Prerequisites" may be performed in any order and/or concurrently.

- 3.1. **PREASSEMBLE** the Radial Filter assembly (stored in the 2101HV warehouse) so that Assembly 350 can be staged for the Inspection Checklist acceptance.
  - 3.1.1. **INSTALL** the gaskets onto the new radial breather filter assembly.
  - 3.1.2. **ENSURE** bolts are lubricated prior to installation.
  - 3.1.3. **INSTALL** the bolts and nuts and **TORQUE** to 84 +/-5 ft-lbs.

Torque Wrench

M&TE # 389-88-01-003 Calibration Due Date 8/2/08

KA Baird

Signature

[Signature]  
(Print & Sign)

4/16/08

Date

- 3.2. **ENSURE** the Radial HEPA filter installation package CLO-WO-08-0579 is ready for work.
- 3.3. **ENSURE** EIN label SX101-WST-FLT-101 has been made and applied to the assembly prior to installation.
- 3.4. **ENSURE** label has been installed on the radial filter weather cover.

"H-2-90718 Sheet 25, ASSY 350"

in ½" black letters per H-2-90718 Sheet 2, Note7.

**CLO-WO-08-0563**  
**241-SX-101 REPLACE BREATHER FILTER WITH RADIAL FILTER**

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- [ ] 3.5. FWS **NOTIFY** QAT prior to the new filter assembly being staged in the field.
- [ ] 3.6. QAT **PERFORM** applicable portions of the Radial Flow Breather Filter Assembly Post-Installation Inspection Checklist.
- [ ] 3.7. The following equipment and tools may be needed for performing this task:
- Hand tools for disconnecting the old filter assembly and valve.
  - Plastic, rubber, sleeving, drape material
  - Absorbent material
  - Decon materials
  - Bag tie-off / horse-tail materials (tape, straps, cutting tools)
  - New Radial filter assembly
- [ ] 3.8. **ENSURE** material / equipment / components are staged for installation.
- [ ] 3.9. FWS **ENSURE** the correct waste containers and supplies are available to perform the work activities as stated on the Waste Planning Checklist. (TO-100-052)
- [ ] 3.10. FWS **ENSURE** a pre-job briefing is conducted in accordance with TFC-OPS-MAINT-C-02 before field work is performed.
- [ ] 3.11. FWS **ENSURE** a walkdown is conducted using the work instructions and Worksite Hazard Analysis with as many of the work crew as possible who will be performing the job to ensure the work instructions/hazard controls are adequate.
- [ ] 3.12. **ENSURE** all shipping and packing material is removed from new equipment prior to installation (IB-06-008).

**CLO-WO-08-0563**  
**241-SX-101 REPLACE BREATHER FILTER WITH RADIAL FILTER**

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**4.0 SPECIFIC WORK INSTRUCTIONS**

4.1. HPT **PERFORM** pre-job radiation and contamination survey of work area.

<u>COF-7342</u>	<u>4-16-08</u>
RSR (SURVEY) Number	Date

4.1.1. **RECORD** subsequent radiological surveys on the Work Record.

4.2. **ENSURE** that the isolation valve for the existing filter is **CLOSED**.

4.3. **INSTALL** ground cover around Riser 18.

4.4. **REMOVE** the ground wire from the breather filter assembly and cut or reconnect below the butterfly valve.

4.5. **ESTABLISH** ARA in work area.

**ENSURE G-1 Filter Housing Is Drained**

**WARNING**

Care should be taken when removing liquids accumulated in filter housing. Removed material should be treated as contaminated. Failure to do so may result in contamination spread.

**CLO-WO-08-0563**  
**241-SX-101 REPLACE BREATHER FILTER WITH RADIAL FILTER**

4.6. **DRAIN** filter housing as follows:

4.6.1. **PLACE** a bag with absorbent material under drain.

4.6.2. **UTILIZING** a damp rag until radiological conditions are verified, **REMOVE** cap or plug from filter drain.

4.6.3. **DRAIN** any liquid from housing.

4.6.4. **REPLACE** drain cap or plug.

4.7. With the assistance of the Crane & Rigging crew, **REMOVE** the existing Breather Filter Housing Assembly (ECN-725506 R-0). The existing breather filter will be removed along with the 4" butterfly valve.

4.7.1. **REMOVE** fasteners from the flanges at the butterfly valve.

4.7.2. **REMOVE** the Breather Filter Assembly.

4.7.2.1. **BAG/CONTAIN** the filter housing openings as it is being removed.

4.7.2.2. **DOUBLE BAG** the filter and seal the bag. The outermost surface of the containers or items are to be <50,000 dpm/100cm<sup>2</sup> beta-gamma and <70 dpm/100 cm<sup>2</sup> alpha.

4.7.3. **REMOVE** the butterfly valve.

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**WARNING:**

**Due to shine from the riser, hands shall be kept away  
from the open riser as much as possible.**

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**CLO-WO-08-0563**  
**241-SX-101 REPLACE BREATHER FILTER WITH RADIAL FILTER**

- 4.8. **CONTROL** the inside of the riser as an HCA.
  
- 4.9. **INSTALL** a temporary cover on the riser, when the riser is open and not being worked on.
  
- 4.10. **INSTALL** the new radial breather filter assembly and isolation valve on Riser 18.  
(Reference ECN-725506 R-0).

4.10.1. **INSTALL** the gasket onto the new radial breather filter assembly.

4.10.2. **ENSURE** bolts are lubricated prior to installation.

4.10.3. **INSTALL** the bolts and **TORQUE** to 84 +/-5 ft-lbs.

Torque Wrench

M&TE # 389-88-01-003 Calibration Due Date 8/7/08

KA Beard [Signature] 4/16/08  
FWS Signature (Print & Sign) Date

4.11. **DOWNPOST** the ARA as survey dictates.

4.12. **ENSURE** the new Radial HEPA filter installation was performed per Work Order CLO-WO-08-0579.

**CLO-WO-08-0563**  
**241-SX-101 REPLACE BREATHER FILTER WITH RADIAL FILTER**

[X] 4.13. QAT **PERFORM** applicable portions of the Radial Flow Breather Filter Assembly Post-Installation Inspection Checklist.

[H] 4.14. HPT **PERFORM** post-job radiation and contamination survey(s) of the work area.

COF-7342                      4-16-08  
 RSR Survey Number                      Date

[X] 4.15. **ENSURE** the seal loop is filled with oil (MSDS 010835 or 021537).

[H] 4.16. **PERFORM** work area clean-up.

[X] 4.17. **ENSURE** new radial filter assembly isolation valve SX-101-WST-V-103, is **OPEN**.

[H] 4.18. **ENSURE** that Environmental Compliance was notified that the filter is installed and the isolation valve is open.

[X] 4.19. **ENSURE DISPOSAL** of the waste per the Waste Planning Checklist.

[X] 4.20. QC **RE-VERIFY** torque after approximately 24 hours (TORQUE to 84 +/-5 ft-lbs)

Torque Wrench

M&TE # 389-88-01-003                      Calibration Due Date 8/2/08

KA Baird                      [Signature]                      4-17-08  
 FWS Signature                      (Print & Sign)                      Date

**CLO-WO-08-0563**  
**241-SX-101 REPLACE BREATHER FILTER WITH RADIAL FILTER**

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4.21. FWS **RECORD** on the Work Record that the job site has been walked down and the area is orderly and all applicable waste has been placed in the proper containers.

4.22. FWS **RECORD** Field Work Completion in CHAMPS.

**5.0 POST MAINTENANCE TESTING**

5.1. Post Maintenance Data Sheet WT-106317, Radial HEPA filter installation, is performed in conjunction with this Work Order.

**6.0 RESTORATION AND POST REVIEW**

6.1. QC **VERIFY** that a QC Inspector has signed and completed the Radial Flow Breather Filter Assembly Post-Installation Inspection Checklist.

<u>K. Willoughby</u>	/	<u>K. Willoughby</u>	/	<u>4/17/08</u>
QAT Name		Signature		Date

6.2. System Engineer **ENSURE** that the old Data Sheets WT-03716 and WT-06800 have been discontinued and new Data Sheet WT-106317 has been activated.

<u>[Signature]</u>	/	<u>Greg Gennick</u>	/	<u>4-21-08</u>
Engineering Name		Signature		Date

**CLO-WO-08-0563**  
**241-SX-101 REPLACE BREATHER FILTER WITH RADIAL FILTER**

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- 6.3. System Engineer **ENSURE** ECN-725506 R-0 has been closed and a copy of the "MODIFICATION COMPLETE" cover page has been inserted into the work package. Complete closeout review.

Coley Gaudin / [Signature]      4.21.08  
Engineering Name / Signature      Date

- 6.4. **FORWARD** the Work Order package to the Operations Engineer for OPS Acceptance.

- 6.5. Operations Engineer **COMPLETE** OPS Acceptance.

---

**NOTE**

The following steps may be worked concurrently, in parallel and/or in any order. RESTORATION AND POST REVIEW steps are not required to be completed to consider the Work Order "Field Work Complete" by the FWS or for Operations Acceptance of the work order. These steps need to be completed prior to Post Review approval.

---

- 6.6. Radiological Control SME determine if ALARA Review trigger levels were exceeded and if an ALARA Review is required.

S.B. Holcomb / [Signature]      4/29/08  
Rad Con SME Print/Sign      Date

Required: \_\_\_\_\_ Not Required: X

- 6.6.1. As applicable, FWS or Planner schedule and perform an ALARA review meeting to complete as soon as possible, not to exceed 30 calendar days from field work complete.

**CLO-WO-08-0563**

**241-SX-101 REPLACE BREATHER FILTER WITH RADIAL FILTER**

- [ ] 6.7. RADCON SME to **CLOSE** the RWP in the ACES system, if no longer needed.

S. B. Holcomb / [Signature] 4/23/08  
Rad Con SME Print Sign Date

- [ ] 6.8. ENVIRONMENTAL **PERFORM** closeout review.

Shelly Doss / [Signature] 4-24-08  
ENVIRONMENTAL Print Sign Date

- [ ] 6.9. **FORWARD** the Work Order package to the Planner for Post Review.

# Work Order: CLO-WO-08-0563

## Title: 241-SX-101 Replace Breather w/ Radial Filter

Step 1 Of 1 Step Id: 001

State: Post Review

Safety Class:

Sched Start:

Sched Comp:

Related Step/Link:

**Step Instructions:**

SX-101 breather filter failed. Needs to be replaced with a Radial Filter.

Assets	Seq	Asset Class	Asset Id	Asset Name	SC/I	Expiration Date
	1	Equipment	SX101-WST-FLT-101	FILTER, BREATHER, G-1 HOUSING, 2	<input type="checkbox"/>	

Trades	Crew	Trade Id:	Trade Description:	Workers	Act Hrs.	Delay Code
	Maintenance	<del>0000</del> N/A (DT 558)	Millwrights	2	N/A	

**Attachments:** There are 28 document(s) attached to this work order

Description	Path/Name
<b>Step Attachment</b>	
AMW AW-1411 for SX-101 & 113 Radial Filters.doc	AMW AW-1411 for SX-101 & 113 Radial Filters__966569.doc
CLO-WO-08-0563 Replace SX-101 BF w Radial Filter RE	CLO-WO-08-0563 Replace SX-101 BF w Radial Filter RECORD__967007.dc
Route Map of SX-Farm.doc	SX-Farm__966098.doc
RWP CO-469 for SX-101 & 113 Radial filters.doc	RWP CO-469 for SX-101 & 113 Radial filters__966570.doc
Tanks Not Requiring Silvershield PPE.doc	Tanks Not Requiring Silvershield PPE__966043.doc
Picture: SX-101 G-1 Breather Filter.JPG	SX-101 G-1 Breather Filter__966148.JPG
Picture: SX-101 riser 18.JPG	sx101 riser 18__966144.JPG
BOM CLO-WO-08-0563	BOM CLO-WO-08-0563
CEHA 0408-324	CEHA 0408-324
USQ	USQ
Waste Planning Checklist	WPC
Ign Source Controls for CLO-WO-08-0563.pdf	Ign Source Controls for CLO-WO-08-0563__966538.pdf
JHA for CLO-WO-08-0563 & 564.pdf	JHA for CLO-WO-08-0563 & 564__966503.pdf
MSDS 010835 Dow Corning 200, 100 CST.pdf	MSDS 010835 Dow Corning 200, 100 CST__966274.pdf
MSDS 012664B WD-40.pdf	MSDS 012664B WD-40__966084.pdf
MSDS 020641 Safegard 5022A.pdf	MSDS 020641; Safegard 5022A__966086.pdf
MSDS 021537 Dow Corning 200, 20 CST.pdf	MSDS 021537 Dow Corning 200, 20 CST__966279.pdf
QC Checklist (AG-1) for SX-101.pdf	QC Checklist (AG-1) for SX-101__966559.pdf
MSDS 012261 Simple Green.TIF	MSDS 012261 Simple Green__966044.TIF
MSDS 014258 Kroil Penetrating Oil.tif	MSDS 014258 Kroil Penetrating Oil__966083.tif
MSDS 023671 Quick 'n Brite.tif	MSDS 023671 Quick 'n Brite__966087.tif
Dwg H-2-90718 Sht 25 (Assy 350)	<a href="http://apdrweb.rl.gov/rimvu/default.aspx?id=DA04374433">http://apdrweb.rl.gov/rimvu/default.aspx?id=DA04374433</a>
ECN-725506 R-0	<a href="http://apdrweb.rl.gov/rimvu/default.aspx?id=DA07029035">http://apdrweb.rl.gov/rimvu/default.aspx?id=DA07029035</a>
Lessons Learned Bulletin IB-06-008	<a href="http://ffc.rl.gov/rapidweb/chg/rppl/rppl/bulletins/viewbulletin.cfm?id=1392">http://ffc.rl.gov/rapidweb/chg/rppl/rppl/bulletins/viewbulletin.cfm?id=1392</a>
OPS Release Form.xdf	OPS Release Form__966262.xdf
Pre-Job A-6002-893 R-1.xdf	Pre-Job A-6002-893 R-1__966046.xdf
WHA for SX B-F Replacement.xdf	WHA for SX-B-F Replacement__966486.xdf

Work Order: CLO-WO-08-0563

Title: 241-SX-101 Replace Breather w/ Radial Filter

Attachments: There are 28 document(s) attached to this work order

Description	Path/Name
Step Attachment WORK RECORD.xdf	WORK RECORD_966047.xdf

Electronic Approvals:

Date	State	Response	Profile	Name	Role
3/26/08 05:19:44	Ready For Planning	Approved	ret_ &_bo_ops_shift_mgr	Ficklin, Jim	
3/27/08 15:55:06	In Planning	Approved	ret_ &_bo_pm_planner	Hjellum, Al	
4/14/08 11:03:21	In Approval	Approved	ret_ &_bo_safety	Powers, Michael	bo_safety
4/14/08 12:47:57	In Approval	Approved	ret_ &_bo_rad_con	Holcomb, Stephen	bo_rad_con
4/14/08 12:57:02	In Approval	Approved	ret_ &_bo_radcon_ &_env	Doss, Shelly D	bo_environmental
4/14/08 13:03:49	In Approval	Approved	ret_ &_bo Resp. Eng.	Farris, Troy R	ret_ &_bo resp. eng.
4/14/08 13:09:59	In Approval	Approved	ret_ &_bo_pm_planner	Hjellum, Al	fws - per telecon
4/14/08 15:22:57	Ready For Work	Approved	ret_ &_bo_ops_shift_mgr	Wallace, Ben	
4/16/08 07:46:42	Working	Approved	ret_ &_bo_ops_shift_mgr	Forsman, Nancy	
4/29/08 18:09:31	Ops Acceptance	Approved	ret_ &_bo_ops_shift_mgr	Malhan, Rajiv	
4/30/08 11:03:10	Post Review	Approved	ret_ &_bo_pm_planner	Hjellum, Al	bo_planner

FWC (See change Completion TAB) Dr Chen

FWS Completed By: K. Baird FWC Date: 04-17-08 Update Job Plan (Y/N): N/A

Completed Satisfactorily (yes, no): Yes Asset Condition: N/A

Comments: \_\_\_\_\_

RPP WORK RECORD

1. Document Number:

CLO-WO-08-0563

2. Work Item Title: 241-SX-101 REPLACE BREATHER FILTER WITH RADIAL FILTER

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/Resource Type	Hours
4-15-08	Walkdown performed, RC bought off materials, gathered supplies, ready for field work		Barnd	FWS	2
4-16-08	Progs b held, replaced breather filter with Radial filter, sum notified, Environmental notified Kelly Doss, Isolation valve open, need to retorque after 24 hours.		Barnd	FWS	2
4-17-09	Retorqued bolts, area walkdown performed, clean and disposed waste		Barnd	FWS	2
4-21-08	Entered copy of mod Work complete ECN-725506 Rev.0 into Work Package following field walkdown		JRH	Eng	3
4/29/08	No ALARA REVIEW IS REQUIRED		<i>[Signature]</i>	RAD	CON

Summary by Craft/Resource Type

Craft/Resource Type	Total Hours	Craft/Resource Type	Total Hours

15

CLO-WO-08-0563  
241-SX-101 REPLACE BREATHER FILTER WITH RADIAL FILTER  
(AND BUTTERFLY VALVE)

Attachment  
Radial Flow Breather Filter Assembly Post-Installation Inspection  
Checklist

Purpose: Visual inspection is used to assess items such as surface condition, alignment of mating surfaces, shape, or evidence of other damage.

Scope: Visual inspections shall be performed on the breather filter assembly components and interconnecting ductwork as outlined in the following checklists (make additional copies as needed). The inspections are limited to items that are readily accessible, without disassembly (for example, many items are not easily assessed inside the completed assemblies). Some radial filters may also be assembled onto new wye assemblies. Because disassembly is not desirable, especially after installation, the inspections should occur and be documented during fabrication and pre- and post-installation activities (as applicable). Items that were previously inspected (e.g., by the manufacturer) cannot be inspected or are not applicable shall be indicated as such on the checklist, with justification/evidence given in the comments column as appropriate (do not delete items from the checklists).

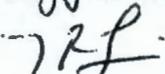
Acceptance Criteria: Unless otherwise noted in the following checklists, **conditions are considered acceptable when there is no visual indication of improper installation, physical damage, structural distress or degradation that would impair the ability of the component/system to perform its intended function.**

Required Inspector: Quality control shall complete (as applicable) and sign each data sheet.

Originated by:  
Signature Required:

 / Gregory J. Gauck  
Retrieval Closure Ventilation System Engineer

4/11/2008  
Date

 TRFARRIS

4-16-08

**VISUAL INSPECTION CHECKLIST**  
**DAMPERS (including valves used as dampers)**  
**Butterfly valve on ductwork (Assembly for Radial Flow Filter)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
DM-1	Housing and duct interface	ASME AG-1, Section TA-I-1200 (a)	KW 4/16/08	No housing. Duct interface only.
DM-2	Actuator linkage, motor, controller	ASME AG-1, Section TA-I-1200 (b)	N/A	Valve design does not have any actuator linkages, motors, or controller.
DM-3	Interferences with moving parts	ASME AG-1, Section TA-I-1200 (c)	N/A (completed via other inspection or process)	The only moving parts are internal to the damper, verified through functional testing.
DM-4	Damper shaft seal	ASME AG-1, Section TA-I-1200 (d)	N/A	Valve design has no damper shaft.
DM-5	Blade edge seals, damper seat	ASME AG-1, Section TA-I-1200 (e)	N/A (completed via other inspection or process)	Seal integrity is verified by testing per ASME B16.34 and verified during procurement activities. Vacuum decay testing also ensures adequate seal during field installation.
DM-6	Limit switches	ASME AG-1, Section TA-I-1200 (f)	N/A	Valve design has no limit switches.
DM-7	Supports and attachments	ASME AG-1, Section TA-I-1200 (g)	N/A	Valve design has no supports or attachments other than its interface with the duct (wye assembly) to which it bolts (covered in DM-1).
DM-8	Bolting and fasteners	ASME AG-1, Section TA-I-1200 (h)	KW 4/17/08	1ST TORQUE KW 4/16/08 2ND TORQUE
DM-9	Instrumentation	ASME AG-1, Section TA-I-1200 (i)	N/A	Valve design has no instrumentation.
DM-10	Electrical connections	ASME AG-1, Section TA-I-1200 (j)	N/A	Valve design has no electrical connections.

**VISUAL INSPECTION CHECKLIST**  
**DAMPERS (including valves used as dampers)**  
**Butterfly valve on ductwork (Assembly for Radial Flow Filter)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
DM-11	Pneumatic connections	ASME AG-1, Section TA-I-1200 (k)	N/A	Valve design has no pneumatic connections.
DM-12	As built configuration in accordance with design drawings	ASME AG-1, Section TA-I-1200 (l)	N/A (completed via other inspection or process)	Normal engineering and work control processes perform this function.
DM-13	Damper nameplate	ASME AG-1, Section TA-I-1200 (m)	KW 4/16/08	Valve damper see 11-2-90718 Sht. 10 latest rev. See <del>PN-171</del> ITEM TRFARR: NUMBER 171 ON SHT 15. 7RP 4-16-08
DM-14	Provisions for access for performing tests and maintenance	ASME AG-1, Section TA-I-1200 (n)	KW 4/16/08	

Quality Control (print name, signature, date):

*K. WILLOUGHBY / K. Willoughby 4/12/08*

**VISUAL INSPECTION CHECKLIST  
TANK-TO-BREATHER FILTER CONNECTING DUCTWORK  
(Mounting Flange Subassembly)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
DW-1	Housing and duct connections (no caulking)	ASME AG-1, Section TA-I-1300 (a)	KW 4/16/08	Mounting flange subassembly- to- riser connection.
DW-2	Provision for opening access doors from both inside and outside	ASME AG-1, Section TA-I-1300 (b)	N/A	By design, there are no doors.
DW-3	Access door seals, gaskets	ASME AG-1, Section TA-I-1300 (c)	N/A	By design, there are no doors.
DW-4	Access door latches	ASME AG-1, Section TA-I-1300 (d)	N/A	By design, there are no doors.
DW-5	Housing internal access ladders and platforms	ASME AG-1, Section TA-I-1300 (e)	N/A	By design, there is no housing.
DW-6	Sample and injection ports, location and caps	ASME AG-1, Section TA-I-1300 (f)	N/A	By design, there are no test ports.
DW-7	Supports and attachments	ASME AG-1, Section TA-I-1300 (g)	N/A	Connection to riser addressed in DW-1. There are no separate supports or attachments.
DW-8	Bolting and fasteners	ASME AG-1, Section TA-I-1300 (h)		1ST TORQUE KW 4/16/08
DW-9	Instrumentation connections	ASME AG-1, Section TA-I-1300 (i)	N/A	By design, there are no instrumentation connections.
DW-10	Electrical connections	ASME AG-1, Section TA-I-1300 (j)	N/A	By design, there are no electrical connections.
DW-11	Housing/duct penetration seals	ASME AG-1, Section TA-I-1300 (k)	N/A	By design, there is no housing.

**VISUAL INSPECTION CHECKLIST**  
**TANK-TO-BREATHER FILTER CONNECTING DUCTWORK**  
**(Mounting Flange Subassembly)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
DW-12	Loop seals (water level), drain connections	ASME AG-1, Section TA-I-1300 (l)	N/A	By design, there are no loop seals or drain lines.
DW-13	Lighting conduits, socket housing seals (flush mounted)	ASME AG-1, Section TA-I-1300 (m)	N/A	By design, there are no lighting conduits.
DW-14	HEPA/adsorber mounting frame continuous seal welds	ASME AG-1, Section TA-I-1300 (n)	N/A	By design, there is no mounting frame.
DW-15	Mounting frame penetrations seal welded	ASME AG-1, Section TA-I-1300 (o)	N/A	By design, there is no mounting frame.
DW-16	Mounting frame seating surface (weld splatter, flatness, scratches)	ASME AG-1, Section TA-I-1300 (p)	Kw 4/16/08	By design, there is no mounting frame. This is for inspection of the threaded hole in the flange.
DW-17	Sample canister installation	ASME AG-1, Section TA-I-1300 (q)	N/A	By design, there is no sample canister.
DW-18	Mounting frame clamping devices	ASME AG-1, Section TA-I-1300 (r)	N/A	By design, there is no mounting frame.
DW-19	As built configuration in accordance with design drawings	ASME AG-1, Section TA-I-1300 (s)	N/A (completed via other inspection or process)	Normal engineering and work control processes perform this function.
DW-20	Provisions for access for performing tests and maintenance	ASME AG-1, Section TA-I-1300 (t)	Kw 4/16/08	Verify filter will be accessible for replacement. No tests required.

**VISUAL INSPECTION CHECKLIST**  
**TANK-TO-BREATHER FILTER CONNECTING DUCTWORK**  
**(Mounting Flange Subassembly)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
DW-21	Lighting for test and maintenance available	ASME AG-1, Section TA-I-1300 (u)	N/A	Not applicable to this assembly (facility or portable lighting used as necessary).

Quality Control (print name, signature, date):

*K. WILLOUGHBY / K. Willoughby 4/17/08*

**VISUAL INSPECTION CHECKLIST  
EXHAUSTER HEATER/FILTER/TEST HOUSINGS  
(Radial Flow HEPA Filter)**

<b>Item #</b>	<b>Inspection Item</b>	<b>Requirement Reference</b>	<b>QC Acceptance (initial &amp; date)</b>	<b>Comments (use comments continuation sheet as needed)</b>
EH-1	Housing and duct connections (no caulking)	ASME AG-1 Section TA-I-1300 (a)	N/A	By design, there is no housing.
EH-2	Provision for opening access doors from both inside and outside	ASME AG-1 Section TA-I-1300 (b)	N/A	By design, there are no doors.
EH-3	Access door seals, gaskets	ASME AG-1 Section TA-I-1300 (c)	N/A	By design, there are no doors.
EH-4	Access door latches	ASME AG-1 Section TA-I-1300 (d)	N/A	By design, there are no doors.
EH-5	Housing internal access ladders and platforms	ASME AG-1 Section TA-I-1300 (e)	N/A	By design, there is no housing.
EH-6	Sample and injections ports, location and caps	ASME AG-1 Section TA-I-1300 (f)	N/A	By design, there are no injection ports.
EH-7	Supports and attachments	ASME AG-1 Section TA-I-1300 (g)	N/A	By design, there are no supports or attachments.
EH-8	Bolting and fasteners	ASME AG-1 Section TA-I-1300 (h) and section TA-I-1600 (g)	N/A	By design, there is no bolting/fasteners.
EH-9	Instrumentation connections	ASME AG-1 Section TA-I-1300 (i)	N/A	By design, there are no instrumentation connections.
EH-10	Electrical connections	ASME AG-1 Section TA-I-1300 (j)	N/A	By design, there are no electrical connections.

**VISUAL INSPECTION CHECKLIST  
EXHAUSTER HEATER/FILTER/TEST HOUSINGS  
(Radial Flow HEPA Filter)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
EH-11	Housing/duct penetration seals	ASME AG-1 Section TA-I-1300 (k)	N/A	By design, there is no housing.
EH-12	Loop seals (water level), drain connections	ASME AG-1 Section TA-I-1300 (l)	N/A	By design, there is no loop seal or drain.
EH-13	Lighting conduits, socket housing seals (flush mounted)	ASME AG-1 Section TA-I-1300 (m)	N/A	By design, there are no lighting conduits/seals.
EH-14	HEPA/adsorber mounting frame continuous seal welds	ASME AG-1 Section TA-I-1300 (n)	N/A	By design, there is no mounting frame.
EH-15	Mounting frame penetrations seal welded	ASME AG-1 Section TA-I-1300 (o)	N/A	By design, there is no mounting frame.
EH-16	Mounting frame seating surface (weld splatter, flatness, scratches)	ASME AG-1 Section TA-I-1300 (p)	Kw 4/16/08	There is no mounting frame. This is for inspection of the threaded nipple of the radial flow filter.
EH-17	Sample canister installation	ASME AG-1 Section TA-I-1300 (q)	N/A	A sample canister is not used in this application.
EH-18	Mounting frame clamping devices	ASME AG-1 Section TA-I-1300 (r)	N/A	No mounting frame clamping devices.
EH-19	As built configuration in accordance with design drawings	ASME AG-1 Section TA-I-1300 (s) and Section TA-I-1600 (h)	N/A (completed via other inspection or process)	By design, there is no housing. HEPA filter configuration is controlled via vendor drawings.

**VISUAL INSPECTION CHECKLIST  
EXHAUSTER HEATER/FILTER/TEST HOUSINGS  
(Radial Flow HEPA Filter)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
EH-20	Provisions for access for performing tests and maintenance	ASME AG-1 Section TA-I-1300 (t) and Section TA-I-1600 (j)	N/A	By design, there is no test or maintenance required.
EH-21	Lighting for test and maintenance available	ASME AG-1 Section TA-I-1300 (u)	N/A	By design, there is no test or maintenance required.
EH-22	Moisture separator media, frame, clamps, and gaskets	ASME AG-1 Section TA-I-1600 (a)	N/A	Moisture separator is not part of this design.
EH-23	Moisture separator water collection system and drains	ASME AG-1 Section TA-I-1600 (b)	N/A	Moisture separator is not part of this design.
EH-24	Prefilter media, frame, clamps, and gaskets	ASME AG-1 Section TA-I-1600 ©	N/A	By design, there is no prefilter.
EH-25	HEPA filter media, frame, clamps, and gaskets	ASME AG-1 Section TA-I-1600 (d)	KW 4/16/08	By design, there are no clamps or gaskets. Inspect filter media and frame.
EH-26	Sealant or caulking (none allowed)	ASME AG-1 Section TA-I-1600 (e)	KW 4/16/08	Anti-galling media (gray Teflon tape) approved for use on threaded nipple on filter. This is covered by the procedure (5-VT-710) used for the filter installation activity.
EH-27	Moisture separator, prefilter, HEPA orientation (vertical)	ASME AG-1 Section TA-I-1600 (f)	N/A	By design, the HEPA filter cannot inadvertently be installed in the incorrect orientation. There is no moisture separator or prefilter.

**VISUAL INSPECTION CHECKLIST  
EXHAUSTER HEATER/FILTER/TEST HOUSINGS  
(Radial Flow HEPA Filter)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
EH-28	HEPA filter nameplate	ASME AG-1 Section TA-I-1600 (i)	KW 4/16/08	This data is recorded on the 5-VT-710 data sheet for filter replacement. * 5X101-NST-FLT-101

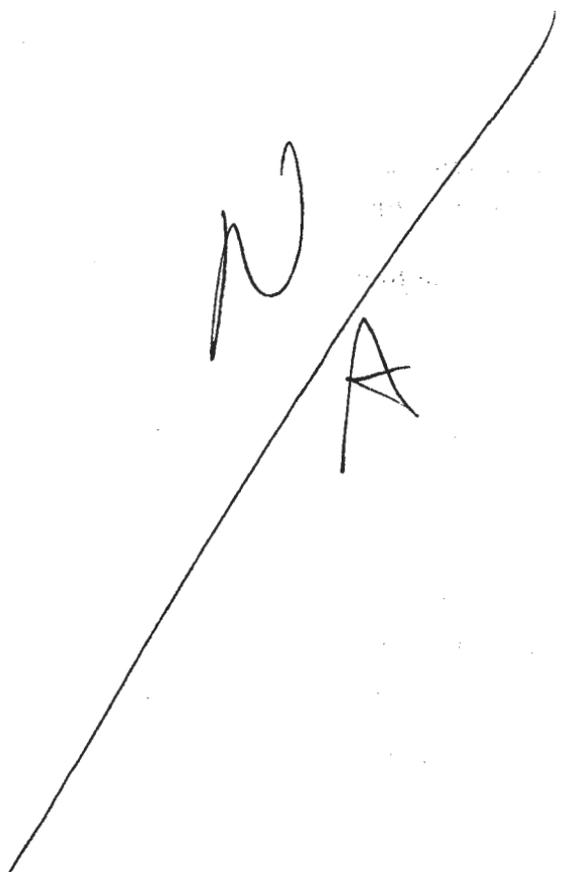
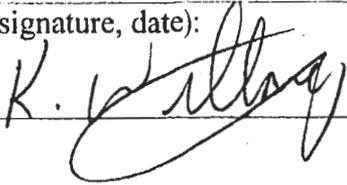
Quality Control (print name, signature, date):

*K. Willoughby* / *K. Willoughby* 4/17/08

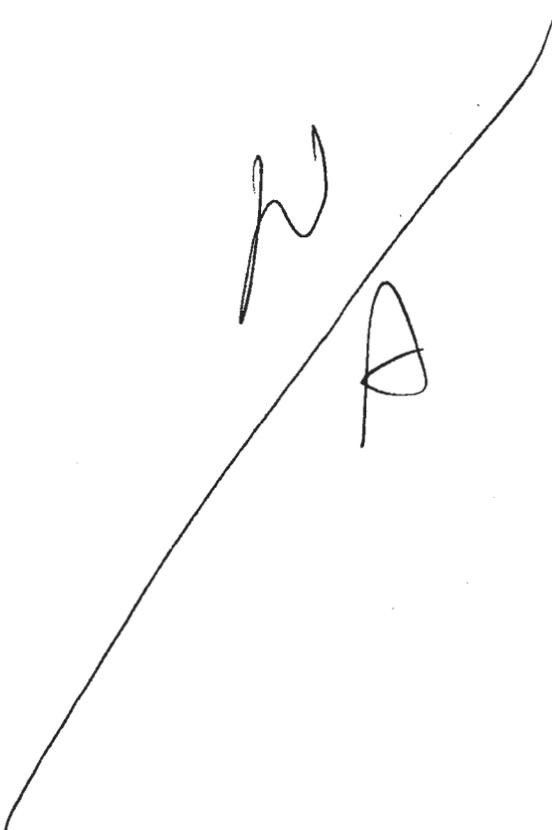
\* 0-007-1-12-RF-NU-00-E3-204059C S/N # 1463461

REF. NCR CH-08-NCR-011 KW 4/16/08

Visual Inspection Comments Continuation Sheet  
(make additional copies as needed)

Item #	Comments/Resolution	Name/Date
		
Quality Control (print name, signature, date):  4/17/08		

Visual Inspection Comments Continuation Sheet  
(make additional copies as needed)

Item #	Comments/Resolution	Name/Date
		

Quality Control (print name, signature, date):

RW

4/17/08

# RADIOLOGICAL WORK PERMIT

Contractor: **CH2M HILL Har d G p, Inc.**  
 Technical Document Num ): CLO-WO-08-0563/ CLO-WO-08-0564

RWP Number: CO-469  
 AMW Number: AW-1411

General: [ ] Start Date: 04/15/2008 Date: 10/14/2008  
 Job Specific: [X]

Job Location: 200W/241 -SX/SX-101&113  
 Brief Job Description and Type of Area: Replace Breather Filters with Radial Filters (RA,CA, HCA, ARA)

Radiation Emitted	Estimated Dose Rates	Estimated Contamination Levels	Job Dose Estimate	Risk Value
[X] Alpha	General Area: 0.5 mrem/hr	Beta/Gamma: 100,000 dpm/100cm <sup>2</sup>	< 200 person-mrem	MEDIUM
[X] Beta	Maximum Contact: 3 mrem/hr	Alpha: < 20 dpm/100 cm <sup>2</sup>		
[X] Gamma	Radiological Worker [ ] I	Internal Dosimetry Requirements		
[ ] Neutrons	Training Req. [X] II	[ ] 3 minute WBC [X] 10 minute WBC	[SI 5] Urinalysis/Isotopes	[SI 5] Chest Count

DOSIMETRY		PERSONAL PROTECTIVE EQUIPMENT			SURVEY REQUIREMENTS	
X	HSD-TLD	X	Coveralls		SI 8	Grab Air Sampling Required
	HCND-TLD		Waterproof Suit	X	SI 8	Lapel Air Sampling Required
X	Pocket Dosimeter		Goretex Suit	X	SI 7	Auto. Survey Device
	Electronic Dosimeter		Cap		SI 7	Self Survey (if qualified)
	Finger Rings	SI 6	Hood			HPT Exit Survey Required
	Time Keeping	SI 6	Surgeon's Gloves	SI 6		
X	Entry Control System	SI 6	Leather Gloves		HPT COVERAGE	
	Brick	SI 6	Canvas & Surgeon's Gloves		SI 4	Continuous
	-Day ACES Auth.		Waterproof Gloves		SI 4	Intermittent
		SI 6	Arm Sleeves			
			Leaded Gloves			

## SPECIAL INSTRUCTIONS

- VOID LIMITS**
  - RA: Whole Body dose rate  $\geq 100$  mrem/hr @ 30 cm.
  - CA: General area removable contamination levels  $\geq 100,000$  dpm/100 cm<sup>2</sup> beta-gamma or  $\geq 210$  dpm/100 cm<sup>2</sup> alpha.
  - HCA: General area removable contamination  $\geq 400,000$  dpm/100cm<sup>2</sup> Beta-Gamma or  $\geq 200$  dpm/100cm<sup>2</sup> Alpha.
- SAFE CONDITION LEVELS**  
**If a Safe Condition Level is met, stop normal work activities, place the work area in a stable condition, perform the actions stated within the associated Safe Condition Level AND notify the RadCon First Line Manager and Shift Operations Manager that a Safe Condition Level was reached or exceeded.**
  - RA: Whole body dose rate  $\geq 80$  mrem/hr, establish/post HRA boundary and secure work activities.
  - CA: General area removable contamination levels  $\geq 80,000$  dpm/100cm<sup>2</sup> beta-gamma or  $\geq 140$  dpm/100cm<sup>2</sup> alpha; establish/post HCA boundary and secure work activities.
  - HCA: General area removable contamination  $\geq 200,000$  dpm/100cm<sup>2</sup> Beta-Gamma or  $\geq 150$  dpm/100cm<sup>2</sup> Alpha., decontaminate to less than these levels
- ACTION LEVELS**
  - CA: General area removable contamination levels  $\geq 50,000$  dpm/100cm<sup>2</sup> beta-gamma or  $\geq 70$  dpm/100cm<sup>2</sup> alpha, decontaminate or apply fixative to reduce contamination to below these levels prior to continuing work activities.
  - HCA: General area removable contamination  $\geq 50,000$  dpm/100cm<sup>2</sup> beta-gamma or  $\geq 70$  dpm/100cm<sup>2</sup> alpha, decontaminate to below these levels.
- HPT COVERAGE**
  - Continuous HPT coverage is required when removing/replacing filter components
  - Intermittent HPT coverage is required during set-up and clean-up
- DOSIMETRY/ACES**
  - Personnel performing hands on work with contaminated components shall ACE in with the appropriate GW or WW Role and the COBIO Role.
- Personnel wearing respiratory protection for radiological purposes shall ACE in with the appropriate respirator role.
- PERSONAL PROTECTIVE EQUIPMENT**
  - HCA: Arm sleeves and an additional pair of gloves required for reaching inside HCA.
  - CA: Single set of PPE with surgeons gloves and canvas, leather or cannors gloves required for entry.
  - A hood will be required when:
    - a worker's head has a potential to contact contaminated surfaces.
    - contamination may drop from above due to overhead work.
    - When wearing a respirator
- SURVEY**
  - Beta-Gamma and Alpha surveys required during the course of all intrusive work:
    - Alpha surveys of personnel and equipment required if alpha contamination was detected during the course of performing work.
    - Alpha survey required if Beta-Gamma contamination is detected.
  - Auto Survey Device (ASD) requirements:
    - If ASD does not have alpha survey capabilities for areas requiring dual personnel surveys, perform a whole body Alpha survey prior to entering ASD.
    - If ASD is inoperable or unavailable, perform whole body survey(s). Perform a follow-up survey in an operable ASD.
- AIR SAMPLING**
  - Work place grab air sampling required when removing/replacing filter components
  - Lapel air sampling required when personnel are wearing respiratory protection for radiological purposes
- SPECIAL PREJOB BRIEFING**
  - None required
- OTHER**
  - N/A

**COPY**

RWP Prepared By: S.B. Holcomb Phone: 373-1263 HPT Phone: 373-3353, 373-0303

Line Mgt. Print: KA Baird Phone: 438-9255 Date: 4/15/08

RC Sup. Initial: [Signature] RC Dir. Print: [Signature] Phone: 372-2833 Date: 4/15/08

Acknowledged by: AJRG Chair (High Risk) Print: [Signature] Date: Other: Print: [Signature] Date:

RWP Field Change Approvals: Line Mgt. Print: [Signature] Date: RC Mgt. Print: [Signature] Date:

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*8 Nov 4-14-08*

Job/Task No.:

Replace SX101/113 Filters

**WORKSITE HAZARD ANALYSIS**

Date:

*4-14-08*

Hazards	Possible Controls	Applicable PPE
<input type="checkbox"/> Electrical	<input type="checkbox"/> Lock out/Tag out <input type="checkbox"/> Barricade <input type="checkbox"/> Electrical Energized Work Permit <input type="checkbox"/> PPE Category (-1 to 4) specify _____ <input type="checkbox"/> AED Location Known/Available	<input checked="" type="checkbox"/> Hard Hat <i>During crane operation</i> <input checked="" type="checkbox"/> Eye/Face Protection
<input checked="" type="checkbox"/> Crane or other Lifting Equipment Lifting and rigging objects	<input type="checkbox"/> Special/Critical Lift Permit <input checked="" type="checkbox"/> Signalman assigned <input checked="" type="checkbox"/> Lifting equip inspected <input checked="" type="checkbox"/> Area around crane barricaded <input checked="" type="checkbox"/> Spotter	<input checked="" type="checkbox"/> Safety Glasses and side shields <input type="checkbox"/> Face Shield <input type="checkbox"/> Face Shield ARC <input type="checkbox"/> Chemical Goggles <input type="checkbox"/> Welding Hood <input type="checkbox"/> Other: _____
<input type="checkbox"/> Vehicular Traffic and/or Heavy Equipment	<input type="checkbox"/> Traffic Barricades <input type="checkbox"/> Cones <input type="checkbox"/> Signs <input type="checkbox"/> Flagman <input type="checkbox"/> Lane closure <input type="checkbox"/> Communication with equipment operator <input type="checkbox"/> Surface condition	<input type="checkbox"/> Hearing Protection <input type="checkbox"/> Ear Muffs <input type="checkbox"/> Specify type: _____ <input type="checkbox"/> Foam/Ear Plugs
<input type="checkbox"/> Overhead Utilities	<input type="checkbox"/> De-energization req. <input type="checkbox"/> Insulation blankets req. <input type="checkbox"/> Wire watcher req. <input type="checkbox"/> Req. clearance distance <input type="checkbox"/> Safe work zone marked	<input checked="" type="checkbox"/> Gloves <input checked="" type="checkbox"/> Silver Shield ( <i>Voluntary</i> ) <input type="checkbox"/> Canvas <input type="checkbox"/> Latex <input type="checkbox"/> Nitrile <input type="checkbox"/> PVC <input type="checkbox"/> Neoprene <input type="checkbox"/> Chemical Resistant Gloves <input type="checkbox"/> Specify: <u>See IS-6</u> <input type="checkbox"/> Insulated Gloves <input type="checkbox"/> Vibration Dampening <input checked="" type="checkbox"/> Leather Gloves <input type="checkbox"/> Rubber Gloves <input type="checkbox"/> Voltage Rated Gloves NFPA-70 <input type="checkbox"/> Other: <u>See CEHA &amp; Table 1</u>
<input type="checkbox"/> Falls (Scaffolding, Ariel lifts, Ladders, Roof work)	<input type="checkbox"/> Inspect general ladder condition before use <input type="checkbox"/> Current Ladder inspections <input type="checkbox"/> Ladder tied off <input type="checkbox"/> Proper angle/placement of ladders <input type="checkbox"/> Proper ladder size <input type="checkbox"/> 100% Tie Off of tools from lifts/scaffolds <input type="checkbox"/> Scaffold User Inspection before use <input type="checkbox"/> Competent Person Inspection of Scaffold <input type="checkbox"/> Fall Protection Plan <input type="checkbox"/> Roof Assessment	
<input type="checkbox"/> Moving/Falling objects from height	<input type="checkbox"/> Tether small objects <input type="checkbox"/> Use rope, canvas bag <input type="checkbox"/> Barricade around potential fall area <input type="checkbox"/> Barricade tape <input type="checkbox"/> Hard hats <input type="checkbox"/> Tie off tools/materials <input type="checkbox"/> Warning signs <input type="checkbox"/> Cover over opening <input type="checkbox"/> Rigid railing required	
<input type="checkbox"/> Excavations	<input type="checkbox"/> Excavation/Shoring Permit <input type="checkbox"/> Inspect prior to entering <input type="checkbox"/> Competent Person Inspection <input type="checkbox"/> Proper sloping/shoring <input type="checkbox"/> Access/egress provided <input type="checkbox"/> Scans <input type="checkbox"/> Barricades	
<input type="checkbox"/> Underground Utilities (Line Locating)	<input type="checkbox"/> Reviewed ground scans <input type="checkbox"/> Received excavation permit <input type="checkbox"/> Maintain clearance distance <input type="checkbox"/> Safe work zone marked <input type="checkbox"/> Insulated hand tools	
<input type="checkbox"/> Fire Hazard, weld, burn, grind, solder	<input type="checkbox"/> Fire Extinguishers <input type="checkbox"/> Fire Watch <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Adjacent area protected <input type="checkbox"/> Unnecessary flammable material removed <input type="checkbox"/> Hot Work Permit	
<input type="checkbox"/> Noise > 85 dBA	<input type="checkbox"/> Hearing protection <input type="checkbox"/> Noise monitoring (IH)	<input checked="" type="checkbox"/> Foot Protection <input checked="" type="checkbox"/> Protective footwear w/ankle support <input type="checkbox"/> Substantial footwear <input type="checkbox"/> Rubber Boots <input type="checkbox"/> Rubber Boots cover <input type="checkbox"/> Dielectric Footwear <input type="checkbox"/> Chemical Resistant Footwear <input type="checkbox"/> Other: _____
<input type="checkbox"/> High Energy Air/Steam/Fluid > 500 PSI or > 200 degrees	<input type="checkbox"/> Depressurize <input type="checkbox"/> PPE <input type="checkbox"/> Whip Check Tie-downs <input type="checkbox"/> Cool down systems <input type="checkbox"/> Lock Out/Tag Out	
<input type="checkbox"/> Stored Energy	<input type="checkbox"/> Lock Out/Tag Out <input type="checkbox"/> Remove energy <input type="checkbox"/> PPE	
<input checked="" type="checkbox"/> Rotating/Moving Equipment or Pinch points	<input type="checkbox"/> Lock Out/Tag Out <input type="checkbox"/> Machine guards in place <input type="checkbox"/> Block parts against motion <input type="checkbox"/> PPE <input checked="" type="checkbox"/> Hand/Body position <input type="checkbox"/> Remove Loose clothing	

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Job/Task No.:

Date:

Replace SX101/113 Filters

### WORKSITE HAZARD ANALYSIS (continued)

Hazards (continued)	Possible Controls (continued)	Applicable PPE (continued)
<input type="checkbox"/> Working With Chemicals (Examples: Lead, Beryllium, Asbestos, Acids, Bases, Paints, Glues, Solvents)	<input type="checkbox"/> Obtain MSDS and review controls <input type="checkbox"/> Have proper containers & labels <input type="checkbox"/> PPE <input type="checkbox"/> Fume Hoods, Glove boxes, etc. <input type="checkbox"/> Safety Showers identified <input type="checkbox"/> Eye wash station <input type="checkbox"/> Asbestos Work Permit <input type="checkbox"/> IH Monitoring Plan # _____ <input type="checkbox"/> Ventilation/Engineering Control	<input checked="" type="checkbox"/> Respiratory Protection <input checked="" type="checkbox"/> APR <input type="checkbox"/> PAPR <input type="checkbox"/> Airline <input type="checkbox"/> SCBA <input type="checkbox"/> Carri-Air <input type="checkbox"/> Specify Cartridges: _____
<input type="checkbox"/> Laboratory Hazards <input type="checkbox"/> Chemical Splashes <input type="checkbox"/> Chemical Compatibility <input type="checkbox"/> Reactive <input type="checkbox"/> Time Sensitive	<input type="checkbox"/> PPE <input type="checkbox"/> Chemical Segregation <input type="checkbox"/> Volume limitations <input type="checkbox"/> Special Labeling or postings <input type="checkbox"/> Fume Hoods	<input type="checkbox"/> Special Clothing <input type="checkbox"/> Tyvek <input type="checkbox"/> NFPA-70 Rated <input type="checkbox"/> Normex III <input type="checkbox"/> Rain Suit <input type="checkbox"/> Safety Vest <input type="checkbox"/> Silver Shield Apron, etc. <input type="checkbox"/> Other: _____
<input type="checkbox"/> Pressurized Gas Cylinders	<input type="checkbox"/> Caps on while moving <input type="checkbox"/> Secured while moving or stored <input type="checkbox"/> Suitable lifting moving device	
<input type="checkbox"/> Potential Contact with Tank Waste	<input type="checkbox"/> Silver shield PPE (Gloves, hood, apron) <input type="checkbox"/> Respiratory protection	
<input type="checkbox"/> Confined Space	<input type="checkbox"/> Confined Space permit	
<input type="checkbox"/> Wall/Ceiling Penetration	<input type="checkbox"/> Scanned area where penetration will take place <input type="checkbox"/> Perform Walk Around	
<input checked="" type="checkbox"/> Radiological <input checked="" type="checkbox"/> Radiological Material <input checked="" type="checkbox"/> Radiological exposure <input checked="" type="checkbox"/> Radiological contamination <input checked="" type="checkbox"/> Loose or airborne contamination <input type="checkbox"/> Fixed contamination disturbed <input type="checkbox"/> Radiological generating device <input checked="" type="checkbox"/> Radiological system breached	<input checked="" type="checkbox"/> Radiological Work Permit # <u>CO-469</u> <input type="checkbox"/> Radiological Screening process <input checked="" type="checkbox"/> ALARA Management Worksheet <input type="checkbox"/> Minimize Time in area (use of mockups, automated systems, etc.) <input type="checkbox"/> Maximize Distance to source of radiation (extension tools, remote operated equip., etc.) <input type="checkbox"/> Use of Shielding <input type="checkbox"/> Reduce item generating concern (contamination or radiation source) <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Contain source of contamination concern <input type="checkbox"/> Apply approved fixative	
<input type="checkbox"/> Flammable Gases	<input type="checkbox"/> Bonding <input type="checkbox"/> Intrinsically safe tools/equipment	
<input type="checkbox"/> Temperature Extremes <input type="checkbox"/> Heat Stress <input type="checkbox"/> Cold Stress	<input type="checkbox"/> Use Heat Stress Mitigation Checklist <input type="checkbox"/> Warming Hut <input type="checkbox"/> Frequency of Breaks	
<input checked="" type="checkbox"/> Tank Farm Vapors	<input checked="" type="checkbox"/> IH Monitoring and Sampling Plan # <u>See Other</u> <input checked="" type="checkbox"/> Temp. VCZ	
<input type="checkbox"/> Lack of Adequate Lighting	<input type="checkbox"/> Change work to daytime <input checked="" type="checkbox"/> Temporary lighting (Light stand or flashlight, etc.)	<i>if performed at night use light plant or equivalent.</i>

Other: VCZs can be downposted per Tank Farm Chemical Exposure Hazard Analysis 0408-324. SX-101 & 113 are on Table 1 list of tanks "not requiring silvershield PPE". IH Monitoring Plan is 7X100-JWJ-08-059.

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**TANK FARM CHEMICAL EXPOSURE HAZARD ANALYSIS**  
Breather Filter and Radial Filter Replacement in SX Farm

0408-324

**Summary:**

Existing vapor control zones (VCZ) can be down posted during work associated with breather and radial filter replacement in SX Farm based upon the following hazard assessment as per TFC-ESHQ-S\_IH-CD-48, *Managing Vapor Control Zones*.

**Work Activity/Task:**

1. Replace breather filters with radial filters
2. Periodically replacing radial filters with new ones
3. The work activities do not require waste-disturbing activities.

**Comparable Activities:**

Personal air sampling performed at SX Farm vapor sources during various corrective and preventive maintenance as well as vent and balance activities showed no exposure measurements approaching 10% of the SX Farm Chemicals of Potential Concern (7X100-JWJ-07-006, *Results of Personal Air Sampling Conducted in S-Complex Tank Farms from November 2004-October 2006*).

**Hazard Identification:**

1. The hazardous gases and vapors potentially generated in the S-Complex Tank Farms waste tanks during non-waste disturbing activities were identified during S-Complex Chemicals of Potential Concern (COPC) Characterization air sampling and are documented in RPP-22491, *Industrial Hygiene Chemical Vapor Technical Basis*.
2. The COPC chemicals identified in S-Complex Tank Farms were ammonia, nitrous oxide, and nitrosamines.

**Data Review:**

1. Review of the TFIH database for air sampling and monitoring
2. Personal air sampling results for representative work activities conducted in S-Complex tank farms from 11/04 – 03/08 showed no COPC exceeded 10% of the Tank Farm Occupational Exposure Limits. (TFIH database query dated 03/28/08) and

**TANK FARM CHEMICAL EXPOSURE HAZARD ANALYSIS**  
Breather Filter and Radial Filter Replacement in SX Farm

0408-324

7X100-JWJ-07-006, *Results of Personal Air Sampling Conducted in S-Complex Tank Farms from November 2004-October 2006.*

3. S-Complex COPC air sampling showed that no COPC exceeded 50% of the Tank Farm occupational exposure limit in the work areas, 5 ft. from any recognized vapor source.

**Vapor Hazard Controls:**

1. This hazard analysis is limited to the following tanks in SX Farm: SX-101, -102, -103, -104, -105, -106, -108, -113, -115 which do not require the use of Silver Shield® gloves (per TFC-ESHQ-S\_IS-C-02). A dermal exposure hazard analysis shall be performed in conjunction with a chemical exposure hazard analysis prior to initiating work in vapor control zones associated with other SX tanks.
2. Chemical Exposure Hazard Analysis (CEHA) 0108-302 applies vapor hazard controls required when replacing breather and radial filters per procedures 5-VT-710 and 5-VT-076.
3. The IHT will conduct air sampling and monitoring as per 7X100-JWJ-08-059, *Air Monitoring and Air Sampling Plan For S, SX And SY-Farm Work Activities.*
4. If IHT monitoring detects ammonia concentrations exceeding the Tank Farm Chemical Action Limit in the work area during the operation, the work will be paused and the workers placed in a safe location and the issue resolved before the work proceeds. If area ammonia levels remain above the chemical action limits for 15 minutes, a vapor control zone will be reestablished around the breather filter.

<b>Title:</b>	<b>Name:</b>	<b>Signature:</b>	<b>Date:</b>	<b>Phone:</b>
Industrial Hygienist:	WL Adams	<i>WL Adams</i>	4/14/08	372-3053
IH Reviewer:	DL Merrill	<i>DL Merrill</i>	4/14/08	
IH Manager:	KA Roueché	<i>Kim Roueche</i>	4/14/08	372-3310
Operations Manager:	JW Ficklin	<i>JW Ficklin</i>	4/14/08	372-3312

## ATTACHMENT A - PPE SELECTION CRITERIA AND GUIDANCE (cont.)

Table 1. Tanks Not Requiring Silvershield PPE.

241-A-101	241-BX-104	241-SX-102
241-A-102	241-BX-105	241-SX-103
241-AN-101	241-BX-107	241-SX-104
241-AN-102	241-BX-109	241-SX-105
241-AN-103	241-BX-110	241-SX-106
241-AN-104	241-BX-111	241-SX-108
241-AN-105	241-BX-112	241-SX-113
241-AN-106	241-BY-101	241-SX-115
241-AN-107	241-BY-102	241-SY-101
241-AP-101	241-BY-103	241-SY-102
241-AP-102	241-BY-104	241-SY-103
241-AP-103	241-BY-105	241-T-102
241-AP-104	241-BY-106	241-T-104
241-AP-105	241-BY-107	241-T-105
241-AP-106	241-BY-108	241-T-107
241-AP-107	241-BY-109	241-T-109
241-AP-108	241-BY-110	241-T-111
241-AW-101	241-BY-111	241-T-112
241-AW-102	241-BY-112	241-T-201
241-AW-103	241-C-101	241-T-202
241-AW-104	241-C-102	241-T-203
241-AW-105	241-C-103	241-T-204
241-AW-106	241-C-104	241-TX-104
241-AX-101	241-C-105	241-TX-113
241-AX-102	241-C-106	241-TX-116
241-AX-103	241-C-107	241-TX-118
241-AX-104	241-C-108	241-TY-104
241-AY-101	241-C-109	241-TY-106
241-AY-102	241-C-110	241-U-102
241-AZ-101	241-C-111	241-U-103
241-AZ-102	241-C-112	241-U-105
241-B-101	241-C-201	241-U-106
241-B-102	241-C-202	241-U-107
241-B-103	241-C-203	241-U-108
241-B-104	241-C-204	241-U-109
241-B-106	241-S-101	241-U-110
241-B-107	241-S-102	241-U-111
241-B-108	241-S-103	241-U-112
241-B-109	241-S-104	241-U-201
241-B-110	241-S-105	241-U-202
241-B-111	241-S-106	241-U-203
241-B-201	241-S-107	241-U-204
241-B-202	241-S-109	
241-B-203	241-S-110	
241-B-204	241-S-111	
241-BX-101	241-S-112	
241-BX-103	241-SX-101	



# River Protection Project



RPP Main | Emergency Security | Waste Services | SWE Personnel Readiness | Performance Assurance | Procedures and Training  
 General Information | Admin Resource Center | Communications | Human Resources | Operations | Safety - Health Programs  
 Engineering Resources | Business - Financial | Projects | Project Delivery | 222 S - Labs ATS ATL | Strat Plng and Proj Ctrls  
 Nuc. Safety and Licensing | Environmental Programs



**RPP Lessons Learned**  **CH2MHILL**  
*Manhattan Group, Inc.*

## Information

### Equipment Installed with Shipping Material Interferences

Bulletin Date: Mar 23 2006 12:00AM      Bulletin Number: IB-06-008

**Lessons Learned Statement:** Equipment installed without removing shipping materials caused interference with the intended design.

**Discussion of Activities:** During maintenance activities, drain lines were discovered to be taped over in boxes installed to house C-200 tank Articulating Mast Systems. The drain holes had been taped over either as a cleanliness measure prior to installation or to eliminate vapors in the box during vacuum line tie-in. Similarly, a ring holding the adjustable weight system for the C-103 vacuum controller system was discovered to be taped to its housing. The ring had been taped to prevent it from moving during shipment and the tape was not removed following installation.

**Analysis:** Although failure of other barriers or simultaneous abnormal conditions would have had to occur to cause equipment problems, failure to inspect the new systems for shipping materials following installation could have contributed to operational problems. Neither instance had Authorization Basis implications.

**Recommended Actions:** Inspect newly installed equipment and components for the presence of shipping materials prior to operation.

**References:** PER-2005-4109, PER-2005-3769

**Originator:** David Saueressig, 373-0183

**Key words:** AMS, Ventilation, Shipping Material

**Distribution:** All CH2M HILL Managers, Operations

Job/Task No.:

Date:

### WORKSITE HAZARD ANALYSIS

Replace SX101/113 Filters

Hazards	Possible Controls	Applicable PPE
<input type="checkbox"/> Electrical	<input type="checkbox"/> Lock out/Tag out <input type="checkbox"/> Barricade <input type="checkbox"/> Electrical Energized Work Permit <input type="checkbox"/> PPE Category (-1 to 4) specify _____ <input type="checkbox"/> AED Location Known/Available	<input checked="" type="checkbox"/> Hard Hat <i>DURING CRANE OPERATIONS</i> <input checked="" type="checkbox"/> Eye/Face Protection
<input checked="" type="checkbox"/> Crane or other Lifting Equipment Lifting and rigging objects	<input type="checkbox"/> Special/Critical Lift Permit <input checked="" type="checkbox"/> Signalman assigned <input checked="" type="checkbox"/> Lifting equip inspected <input checked="" type="checkbox"/> Area around crane barricaded <input checked="" type="checkbox"/> Spotter	<input checked="" type="checkbox"/> Safety Glasses and side shields <input type="checkbox"/> Face Shield <input type="checkbox"/> Face Shield ARC <input type="checkbox"/> Chemical Goggles <input type="checkbox"/> Welding Hood <input type="checkbox"/> Other: _____
<input type="checkbox"/> Vehicular Traffic and/or Heavy Equipment	<input type="checkbox"/> Traffic Barricades <input type="checkbox"/> Cones <input type="checkbox"/> Signs <input type="checkbox"/> Flagman <input type="checkbox"/> Lane closure <input type="checkbox"/> Communication with equipment operator <input type="checkbox"/> Surface condition	<input type="checkbox"/> Hearing Protection <input type="checkbox"/> Ear Muffs <input type="checkbox"/> Specify type: _____ <input type="checkbox"/> Foam/Ear Plugs
<input type="checkbox"/> Overhead Utilities	<input type="checkbox"/> De-energization req. <input type="checkbox"/> Insulation blankets req. <input type="checkbox"/> Wire watcher req. <input type="checkbox"/> Req. clearance distance <input type="checkbox"/> Safe work zone marked	<input type="checkbox"/> Gloves <input checked="" type="checkbox"/> Silver Shield ( <i>VOLUNTARY</i> ) <input type="checkbox"/> Canvas <input type="checkbox"/> Latex <input type="checkbox"/> Nitrile <input type="checkbox"/> PVC <input type="checkbox"/> Neoprene <input type="checkbox"/> Chemical Resistant Gloves <input type="checkbox"/> Specify: <u>See IS-6</u>
<input type="checkbox"/> Falls (Scaffolding, Ariel lifts, Ladders, Roof work)	<input type="checkbox"/> Inspect general ladder condition before use <input type="checkbox"/> Current Ladder inspections <input type="checkbox"/> Ladder tied off <input type="checkbox"/> Proper angle/placement of ladders <input type="checkbox"/> Proper ladder size <input type="checkbox"/> 100% Tie Off of tools from lifts/scaffolds <input type="checkbox"/> Scaffold User Inspection before use <input type="checkbox"/> Competent Person Inspection of Scaffold <input type="checkbox"/> Fall Protection Plan <input type="checkbox"/> Roof Assessment	<input type="checkbox"/> Insulated Gloves <input type="checkbox"/> Vibration Dampening <input checked="" type="checkbox"/> Leather Gloves <input type="checkbox"/> Rubber Gloves <input type="checkbox"/> Voltage Rated Gloves NFPA-70 <input type="checkbox"/> Other: <u>See CEHA &amp; Table 1</u>
<input type="checkbox"/> Moving/Falling objects from height	<input type="checkbox"/> Tether small objects <input type="checkbox"/> Use rope, canvas bag <input type="checkbox"/> Barricade around potential fall area <input type="checkbox"/> Barricade tape <input type="checkbox"/> Hard hats <input type="checkbox"/> Tie off tools/materials <input type="checkbox"/> Warning signs <input type="checkbox"/> Cover over opening <input type="checkbox"/> Rigid railing required	<input type="checkbox"/> Foot Protection <input checked="" type="checkbox"/> Protective footwear w/ankle support <input type="checkbox"/> Substantial footwear <input type="checkbox"/> Rubber Boots <input type="checkbox"/> Rubber Boots cover <input type="checkbox"/> Dielectric Footwear <input type="checkbox"/> Chemical Resistant Footwear <input type="checkbox"/> Other: _____
<input type="checkbox"/> Excavations	<input type="checkbox"/> Excavation/Shoring Permit <input type="checkbox"/> Inspect prior to entering <input type="checkbox"/> Competent Person Inspection <input type="checkbox"/> Proper sloping/shoring <input type="checkbox"/> Access/egress provided <input type="checkbox"/> Scans <input type="checkbox"/> Barricades	
<input type="checkbox"/> Underground Utilities (Line Locating)	<input type="checkbox"/> Reviewed ground scans <input type="checkbox"/> Received excavation permit <input type="checkbox"/> Maintain clearance distance <input type="checkbox"/> Safe work zone marked <input type="checkbox"/> Insulated hand tools	
<input type="checkbox"/> Fire Hazard, weld, burn, grind, solder	<input type="checkbox"/> Fire Extinguishers <input type="checkbox"/> Fire Watch <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Adjacent area protected <input type="checkbox"/> Unnecessary flammable material removed <input type="checkbox"/> Hot Work Permit	
<input type="checkbox"/> Noise > 85 dBA	<input type="checkbox"/> Hearing protection <input type="checkbox"/> Noise monitoring (IH)	
<input type="checkbox"/> High Energy Air/Steam/Fluid > 500 PSI or > 200 degrees	<input type="checkbox"/> Depressurize <input type="checkbox"/> PPE <input type="checkbox"/> Whip Check Tie-downs <input type="checkbox"/> Cool down systems <input type="checkbox"/> Lock Out/Tag Out	
<input type="checkbox"/> Stored Energy	<input type="checkbox"/> Lock Out/Tag Out <input type="checkbox"/> Remove energy <input type="checkbox"/> PPE	
<input checked="" type="checkbox"/> Rotating/Moving Equipment or Pinch points	<input type="checkbox"/> Lock Out/Tag Out <input type="checkbox"/> Machine guards in place <input type="checkbox"/> Block parts against motion <input type="checkbox"/> PPE <input checked="" type="checkbox"/> Hand/Body position <input type="checkbox"/> Remove Loose clothing	

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Job/Task No.:

Date:

### WORKSITE HAZARD ANALYSIS (continued)

Replace SX101/113 Filters

Hazards (continued)	Possible Controls (continued)	Applicable PPE (continued)
<input type="checkbox"/> Working With Chemicals (Examples: Lead, Beryllium, Asbestos, Acids, Bases, Paints, Glues, Solvents)	<input type="checkbox"/> Obtain MSDS and review controls <input type="checkbox"/> Have proper containers & labels <input type="checkbox"/> PPE <input type="checkbox"/> Fume Hoods, Glove boxes, etc. <input type="checkbox"/> Safety Showers identified <input type="checkbox"/> Eye wash station <input type="checkbox"/> Asbestos Work Permit <input type="checkbox"/> IH Monitoring Plan # _____ <input type="checkbox"/> Ventilation/Engineering Control	<input checked="" type="checkbox"/> Respiratory Protection <input checked="" type="checkbox"/> APR <input type="checkbox"/> PAPR <input type="checkbox"/> Airline <input type="checkbox"/> SCBA <input type="checkbox"/> Carri-Air <input type="checkbox"/> Specify Cartridges: _____
<input type="checkbox"/> Laboratory Hazards <input type="checkbox"/> Chemical Splashes <input type="checkbox"/> Chemical Compatibility <input type="checkbox"/> Reactive <input type="checkbox"/> Time Sensitive	<input type="checkbox"/> PPE <input type="checkbox"/> Chemical Segregation <input type="checkbox"/> Volume limitations <input type="checkbox"/> Special Labeling or postings <input type="checkbox"/> Fume Hoods	<input type="checkbox"/> Special Clothing <input type="checkbox"/> Tyvek <input type="checkbox"/> NFPA-70 Rated <input type="checkbox"/> Normex III <input type="checkbox"/> Rain Suit <input type="checkbox"/> Safety Vest <input type="checkbox"/> Silver Shield Apron, etc. <input type="checkbox"/> Other: _____
<input type="checkbox"/> Pressurized Gas Cylinders	<input type="checkbox"/> Caps on while moving <input type="checkbox"/> Secured while moving or stored <input type="checkbox"/> Suitable lifting moving device	
<input type="checkbox"/> Potential Contact with Tank Waste	<input type="checkbox"/> Silver shield PPE (Gloves, hood, apron) <input type="checkbox"/> Respiratory protection	
<input type="checkbox"/> Confined Space	<input type="checkbox"/> Confined Space permit	
<input type="checkbox"/> Wall/Ceiling Penetration	<input type="checkbox"/> Scanned area where penetration will take place <input type="checkbox"/> Perform Walk Around	
<input checked="" type="checkbox"/> Radiological <input checked="" type="checkbox"/> Radiological Material <input checked="" type="checkbox"/> Radiological exposure <input checked="" type="checkbox"/> Radiological contamination <input checked="" type="checkbox"/> Loose or airborne contamination <input type="checkbox"/> Fixed contamination disturbed <input type="checkbox"/> Radiological generating device <input checked="" type="checkbox"/> Radiological system breached	<input checked="" type="checkbox"/> Radiological Work Permit # <u>CO-469</u> <input type="checkbox"/> Radiological Screening process <input checked="" type="checkbox"/> ALARA Management Worksheet <input type="checkbox"/> Minimize Time in area (use of mockups, automated systems, etc.) <input type="checkbox"/> Maximize Distance to source of radiation (extension tools, remote operated equip., etc.) <input type="checkbox"/> Use of Shielding <input type="checkbox"/> Reduce item generating concern (contamination or radiation source) <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Contain source of contamination concern <input type="checkbox"/> Apply approved fixative	
<input type="checkbox"/> Flammable Gases	<input type="checkbox"/> Bonding <input type="checkbox"/> Intrinsically safe tools/equipment	
<input type="checkbox"/> Temperature Extremes <input type="checkbox"/> Heat Stress <input type="checkbox"/> Cold Stress	<input type="checkbox"/> Use Heat Stress Mitigation Checklist <input type="checkbox"/> Warming Hut <input type="checkbox"/> Frequency of Breaks	
<input checked="" type="checkbox"/> Tank Farm Vapors	<input checked="" type="checkbox"/> IH Monitoring and Sampling Plan # <u>See Other</u> <input checked="" type="checkbox"/> Temp. VCZ	
<input type="checkbox"/> Lack of Adequate Lighting	<input type="checkbox"/> Change work to daytime <input checked="" type="checkbox"/> Temporary lighting (Light stand or flashlight, etc.)	<i>it performed at night</i> <i>USE LIGHT PLANT OR EQUIVALENT</i>

ther:

CZs can be downposted per Tank Farm Chemical Exposure Hazard Analysis 0408-324. SX-101 & 113 are on Table 1 list of tanks "not requiring silvershield PPE". IH Monitoring Plan is 7X100-JWJ-08-059.

NE

**SAFETY IS NO ACCIDENT**

**PRE-JOB BRIEFING**

Job Description/Title  
241-SX-101 & SX-113 Replace Breather Filters with Radial Filters

Date  
4-16-08

Work Order No.:  
CLO-WO-08-0563 & 564

Supervisor: *KA Baird*

Place a check mark in all that apply

\* Use as applicable for General Pre-Job Briefings  
# Required for medium or high radiological risk work activities

**Define the Work**

- #\*Work Scope
- \*Purpose and nature of work
- #\*Tasks and Critical Tasks
- \*Tasks assignments
- \*Procedural or Work Instruction Adherence/Use
- #\*Roles and Responsibilities
- \*Special qualifications or training
- Handoffs
- Controlling Authority
- Outside Resources Required
- \_\_\_\_\_

**Hazards and Controls**

- #\*Review the Worksite Hazard Analysis (WHA)
- #\*Discuss the controls and PPE identified in the WHA
- \*Discuss the precautions in the work instructions
- \*Discuss any warnings or cautions listed in the work instruction or procedure
- \*Error Likely situations
- Discuss contingency plans
- #\*Discuss the permits and their controls
- #\*Discuss any ALARA aspects of the work
- Discuss Voluntary Use of Respirators
- Discuss engineered or administrative controls for Radiological Containments
- \_\_\_\_\_

**Prerequisites**

- #\*Review the prerequisites listed in work instructions or procedures
- Review Communication requirements (What, Who, When) (Three-Way Communications)
- Tools, Materials, or Equipment required to be staged
- \*Technical Specification Requirements (TSRs)
- \*Limiting Condition for Operations (LCOs)
- \*Valve Manipulation Walkdowns (see Pre-Job Briefing procedure)
- Oversight Requirements (Senior Supervisory Watch)
- \_\_\_\_\_

**Special Requirements or Unusual Conditions**

- #\*Interface with other organizations
- \*Potential Communication obstacles
- #\*Other Work in the Area
- Changes in Scope or Work Conditions
- #\*Procedure questions or errors
- Equipment line-up/configuration
- #Hold Points, and who is responsible to complete
- \_\_\_\_\_

**Lockout Tag-out Requirements**

- \*Review Tagout Authorization and Tags
- Identify affected employees
- \*Identify Authorized workers
- Identify Primary Authorized worker (if used)
- \*Authorized Worker Lock and Tag
- \*Personal Locking Devices
- \_\_\_\_\_

**Abnormal Events**

- #\*Emergency Response
- \*Alarm Response
- Location of Nearest:
  - Spill Kit
  - Operable Safety Shower
  - Operable Decontamination facility
  - Event response equipment, supplies, personnel
- \*Roles and Responsibilities for Injury, Spills, etc.
- \*Lessons Learned
- \_\_\_\_\_

**Post Work Activities**

- #\*House Keeping/Final Cleanup
- \*Post Maintenance Testing
- Post Job Reviews/Debriefs
- Post Job ALARA review
- \_\_\_\_\_

Comments

Supervisor signature and date indicates that all personnel have been briefed on the areas indicated by a check mark.

Supervisor Signature *[Signature]*

Date

*4-16-08*

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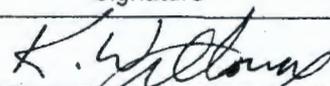
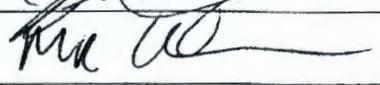
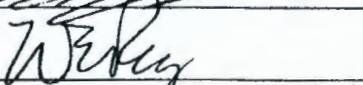
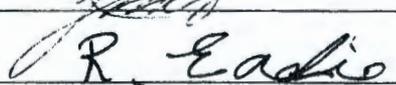
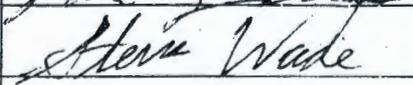
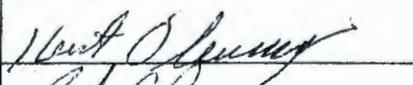
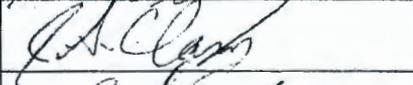
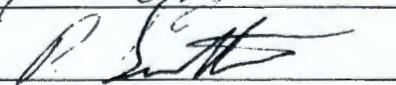
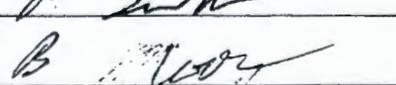
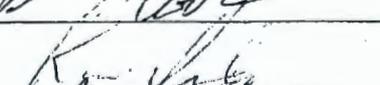
**CH2M HILL  
ATTENDANCE ROSTER**

Subject:

241-5X-113, 101 Breather Filter

Date: 4-16-08

Leader: KA Baird

NAME (Print)	Signature	Position/Title	Organization
K. Willoughby		QC	CH2M
J PEREZ		NCO	CH2M
M. R. CUMMINS		NCO	CH2M
A JOHNSON		HPT	CO
W. Perry		HPT	CO
C. Brown		NCO	BO
Judy		PCT	BO
R. Eadie		DRIVER	AH,
M. Bingham		SM	FH
STEVE WADE		SM	FH
Kurt Obermeyer		IWI	FH
J.S. Clancy		C/O	F.H.
R Sutton		IWI	FH
B Moon		IWI	FH
K. SANDOZ		IWI	SCIR
Flu Carson		elec.	CO
William J. Sullivan		IWT	BO
T. Kennedy		NCO	BO
RON FRINK		FAC REP	ORP

## WORK RELEASE CHECKLIST FOR OE'S

(For Operations Pre-Release Review)

Work Package No.: CLO-WO-09-0563

Reviewed By: D. L. WALLACE

Date: 4-14-08

Title: 241-SX-101 REPLACE BREATHER FILTER WITH RADIAL FILTER

### Document Check:

N/A YES

- Work Instructions
- Data Sheets
- BOM
- CACN listed
- Hold Points
- Waste Planning Checklist
- WHA / JSA
- Pre-Job Safety Meeting form
- Attendance Roster
- RWP
- ALARA Management Worksheet
- OTP (Operational Test Procedure)
- ATP (Acceptance Test Procedure)
- USQ Eval. # ( TF-09-0640-S-R0 ) cat. exc
- ECNs ( # 725506-R0 )  
(# \_\_\_\_\_ ) (# \_\_\_\_\_ )
- Reference Drawings
- Lockout / Tagout Authorization or AWT form prepared
- Asbestos Work Permit / Negative Exposure Assessment
- Hot Work Permit (fire watch required)
- Confined Space Entry Permit
- Non-Permit Confined Space monitoring form
- Excavation Permit
- Ground Scan
- EEWP
- Procedures
- Vehicle Route Map
- Critical Lift Procedure
- Hoisting and Rigging Information
- MSDS Sheets
- Glove Bag / Containment Form
- Ignition Source Control Requirements Screening
- Standing Orders

### Limiting Conditions for Operation (LCOs):

N/A YES

- 3.1.1 Transfer Leak Detection Systems
- 3.1.2 Backflow Prevention Systems
- 3.2.1 DST Primary Ventilation Systems
- 3.2.2 SST Flammable Gas Concentration
- 3.2.3 SST 241-B-203 and 241-B-204  
Passive Ventilation Systems

### Administrative Controls (ACs):

N/A YES

- 5.10 Flammable Gas Controls
- 5.11 Transfer Controls
- 5.12 Administrative Lock Controls
- 5.13 Bulk Chemical Addition Controls
- 5.14 Dome Loading Controls
- 5.15 Tank Farm Instrumentation
- 5.16 Corrosion Mitigation Controls
- 5.17 Vacuum Retrieval Controls

### 242-A Administrative Controls (ACs):

N/A YES

- 5.6.1.1 Restriction on 242-A Pump Room and  
Evaporator Room Access
- 5.6.1.2 Sample Cubicle Leak Detection
- 5.6.1.4 Fire Protection
- 5.6.1.11 242-A Evaporator Instrumentation

Comments:

*\* NEED TO VERIFY PARTS ARE HERE AVAILABLE.*  
*\* Route map needs to be checked out.*

**WORK RELEASE CHECKLIST FOR OE'S (continued)**  
**(For Operations Pre-Release Review)**

Work Package No.: CLO-WO-08-0563 Reviewed By: B L CANACE Date: 4/14/02

Title: 241-SX-101 REPLACE BREATHER FILTER WITH RADIAL FILTER

		YES	N/A
1.	Is configuration of equipment and systems properly identified for safe operation while the work is being performed?	<input checked="" type="radio"/>	<input type="radio"/>
2.	Is operability of the equipment and systems properly restored as part of the retesting? (SS/SC must address retest.)	<input type="radio"/>	<input checked="" type="radio"/>
3.	Are the Lock and Tag steps required to install and remove included in the work document and are the forms complete and in the WP?	<input type="radio"/>	<input checked="" type="radio"/>
4.	Are TSR, LCO, OSD, and AB requirements properly included? (Note for LCO entry/exit.)	<input type="radio"/>	<input checked="" type="radio"/>
5.	Are work scope boundaries clear and the forms complete and in the WP?	<input checked="" type="radio"/>	<input type="radio"/>

Comments:

NO Id: CLO-WO-08-0563

### Waste Planning Checklist

- 1. Will waste be generated?  Yes
- 2. Will waste be generated in a radiological buffer area or contamination area?  Yes
- 3. Will EQ be removed? (TF-cover blocks, 222S-Process EQ)  Yes
- 4. Will waste contact process waste, tank waste, or tank waste contaminated material?  No
- 5. Will work involve soil removal?  No
- 6. Will there be any aerosol can(s) disposed of?  Yes
- 7. Will asbestos waste be disposed of?  No
- 8. Will HEPA filters be disposed of?  Yes
- 9. Will chemical products or paint be used or disposed of?  No
- 10. The following waste minimization techniques will be used?  Source reduction and waste segregation

CHEMICAL/PAINT PRODUCTS	
Msd No	Chemical / Product Name
020641	SAFEGARD 5022A
012261	SIMPLE GREEN
012664	WD-40
014786	CERTANA 1000
010835	Dow Corning 200, 100 CST
021537	Dow Corning 200, 20 CST
014258	Kroil Penetrating Oil
023671	Quick n Brite

#### 11. GENERAL DESCRIPTION OF WASTE

- Breather filter assembly including the butterfly valve. Approximately 80 lbs.
- HEPA filter, condensate : ~40 lbs
- Rags, plastic, tape : ~20 lbs
- Gasket, bolts, nuts, and misc. parts: ~20 lbs

11a. Estimate Waste Generated Quantity:  LBS Per:  Day Job Length

#### WASTE MANAGEMENT CONTROLS

#### Comments

12. Is Waste Regulated as a Dangerous Waste?  No See designation note below

#### 12a. Disposition Instructions:

- Bring into the radiation zone only materials/products needed for the job.
- Survey and release unused products, then return to stock for future use.
- Survey and release empty or unusable aerosol cans for disposal as hazardous waste or non-regulated waste. Waste generator must complete a "Radiological Evaluation for Release" (A-6004-227) or "RCRA/TSCA Waste Radiological Release" (A-6004-228). If necessary, contact TF Waste Operations dispatch for additional information.
- Ensure all free liquids, if present, are stabilized with approved stabilizer.

#### Low Level Waste Disposal:

- Dispose of debris waste with incidental contact with condensate or contains small amount of the products listed above (<5% by wt.) in the nearest low-level waste (LLW) collection container/shed.
- HEPA filter should be disposed of as low level waste.

#### General Disposal Instructions:

- Package waste, including asbestos, in accordance with procedure TO-100-052.
- Ensure to limit the weight of each waste bag to 40 lbs for easy and safe handling.
- FWS to request containers and ensure delivery prior to the start of the job.

#### Designation Note:

1. WD-40, Kroil and Safeguard 5022A are regulated as products, but on debris in small quantity (<5% by wt.) are no longer regulated. Debris waste contaminated with >5% by wt. of the above products should be managed as mixed waste.
2. Simple Green, Certana 1000, Quick n' Brite, Dow Corning 200, 100 CST, Dow Corning 200, 20 CST are not regulated products.
3. Condensation of vapors and deposition of particulates from uncontained gasses from the tank vapor space does not constitute mixing under RCRA, and therefore listed waste codes would not apply to ventilation system components such as ductwork, HEPA filters and housings.

- 13. Facility Operations has been notified to take samples? (N/A if not required)  N/A
- 14. Is a container already available for each disposition listed in the instructions?  No
- 15. Does the quantity of the waste exceed capacity of available containers?  No
- 16. Identify satellite accumulation area or accumulation area container(s) locations:

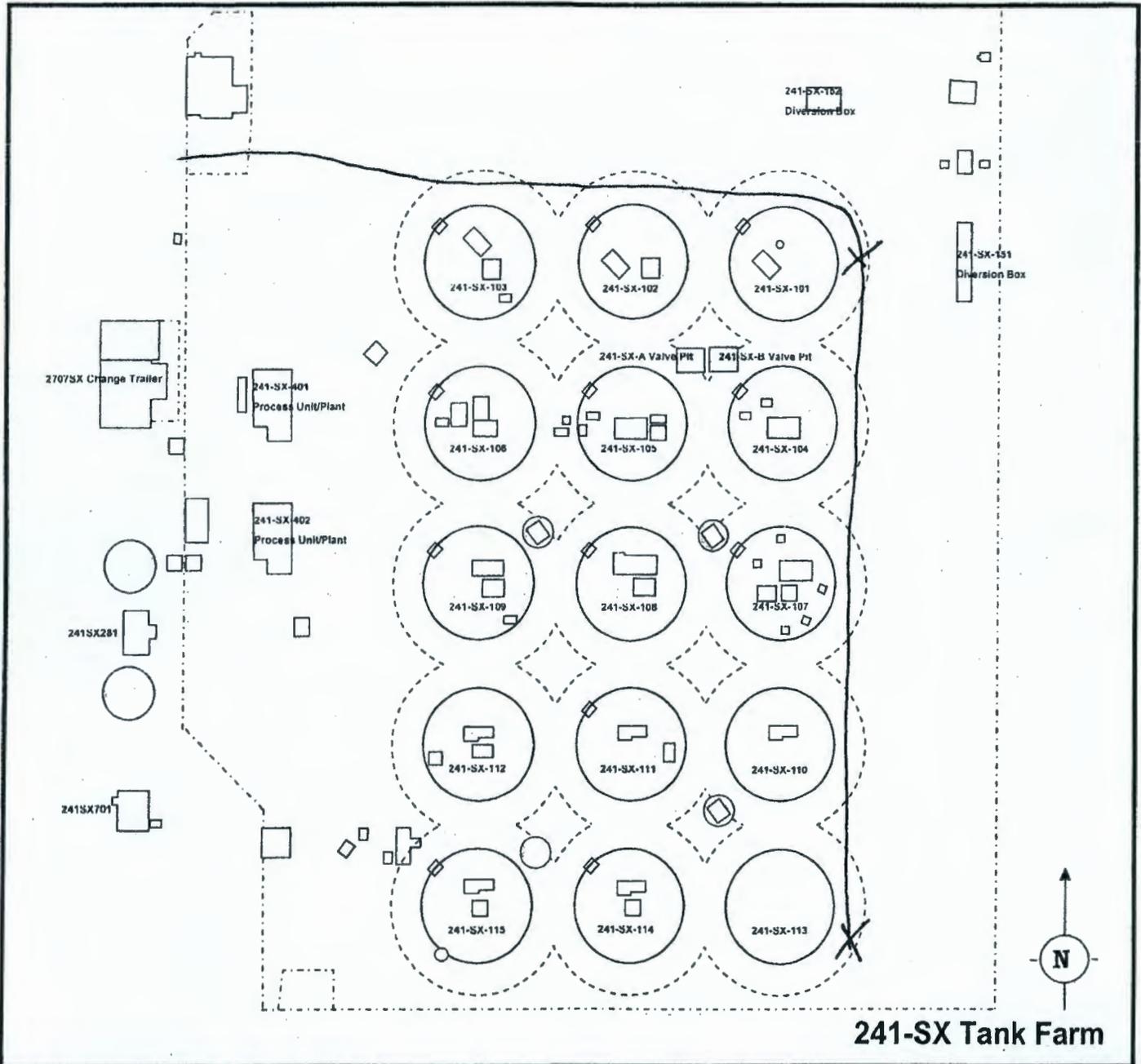
Prepared By: Mandrake Pascual

Date: 00/00/0000

Complete:

VEHICLE AND DOME LOAD CONTROL  
IN TANK FARM FACILITIES

ATTACHMENT A – TANK FARM VEHICLE ROUTE MAP



241-SX Tank Farm

If a vehicle travels through the exclusion zones or over the domes of other tanks to reach the work location, the dome load log for each affected tank shall be updated as required by Section 4.3, step 11.

Remarks: 75 ton (130K lbs), step van (15K lbs)

Preparer KA Baird

Date 4-15-08

Field Work Supervisor KA Baird

Date 4-15-08

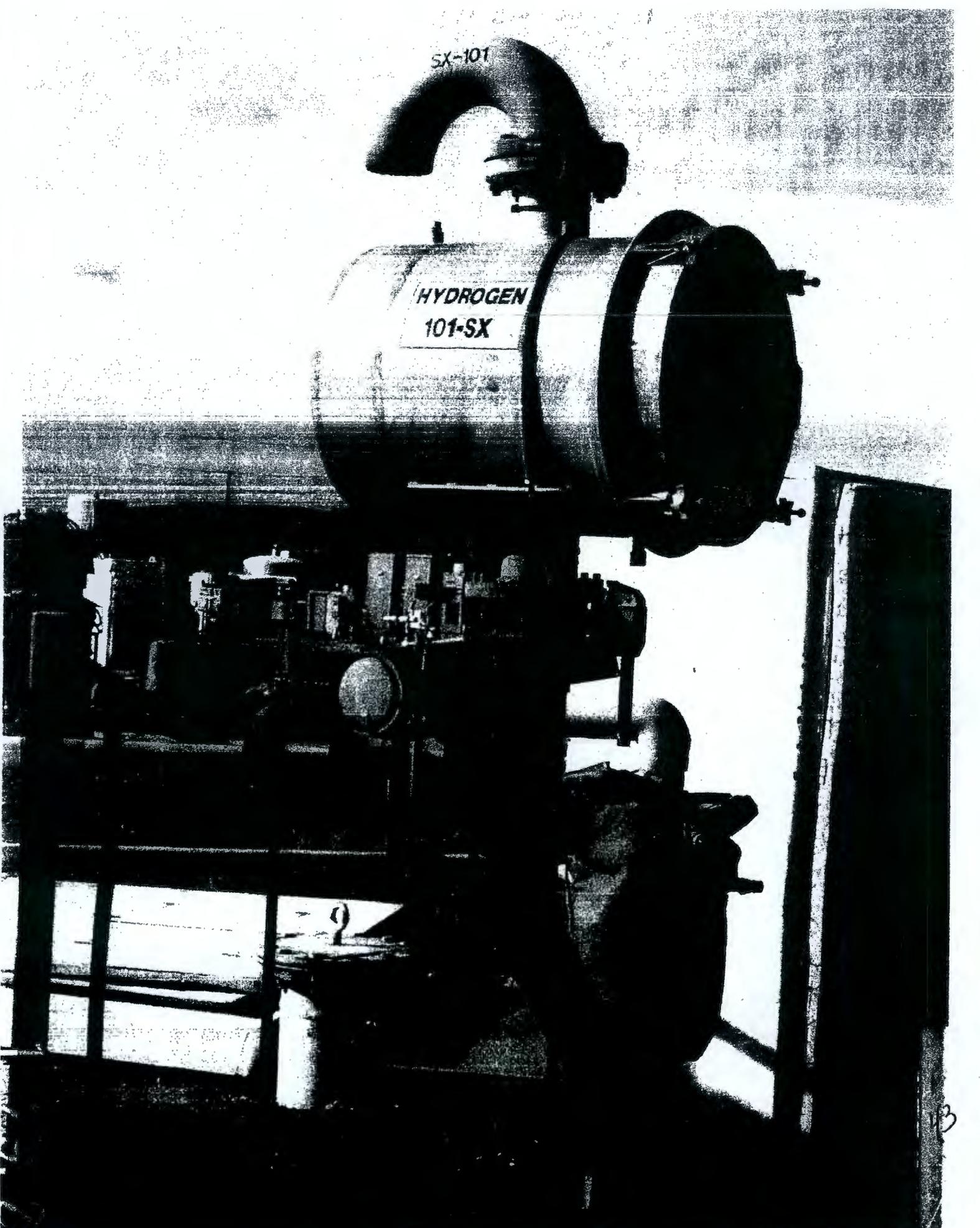
Engineering AK B...  
(Required for double shell tank farms except for 241-SY)

Date 4/15/08

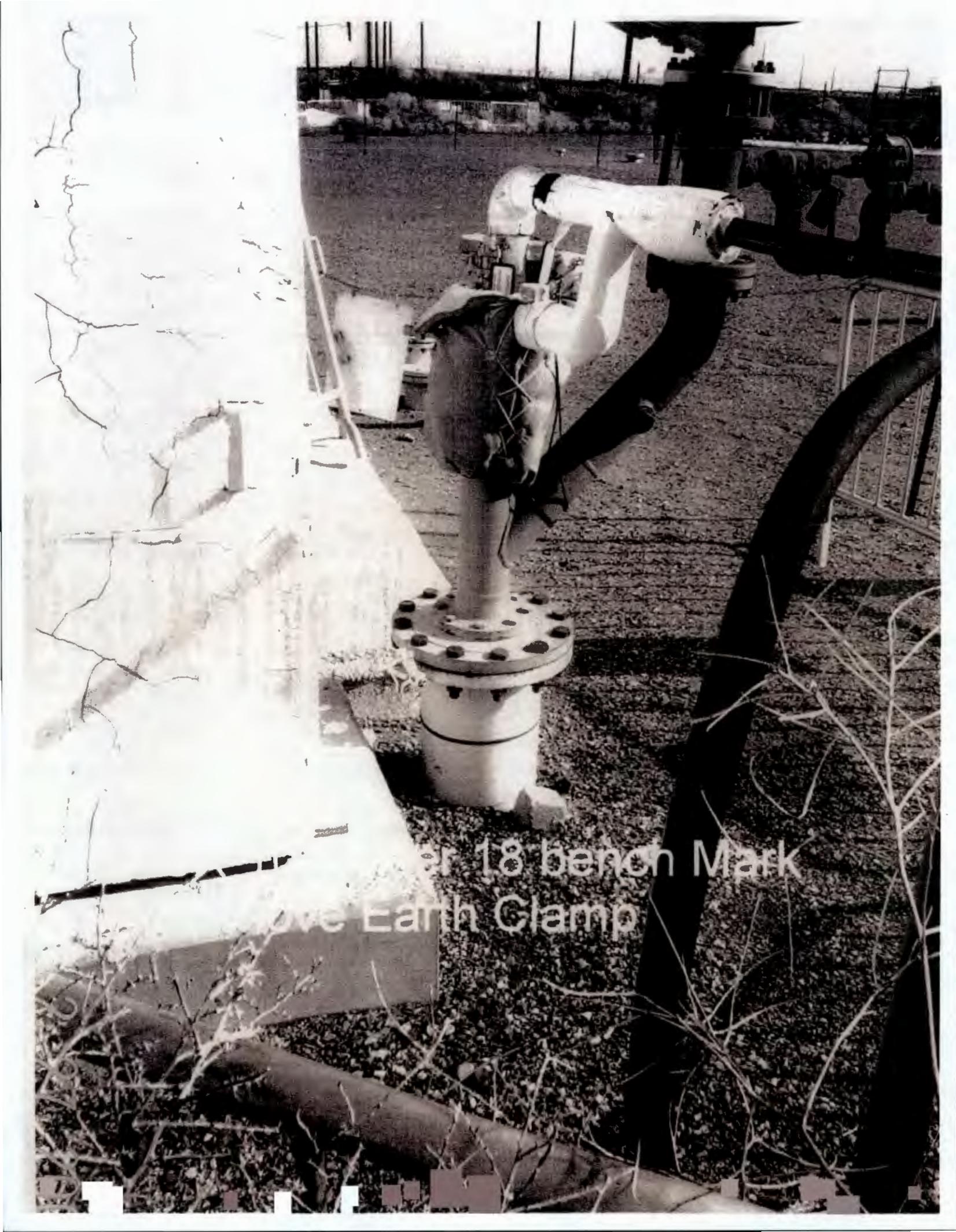
47

SX-101

HYDROGEN  
101-SX



13



Water 18 bench Mark  
Above Earth Clamp

CH2M BILL OF MATERIAL

ORIGINAL

B.O.M. Suppl. 0

End Use: SX-101 Radial Filter				Wk. Pkg. No.: CLO-WO-08-0563				CACN/COA: 501956/FA30					
Date: 03/26/2008		Requestor: Hjellum, Al		Delivery Location: 2101 HV		Premium Freight <input type="checkbox"/>		Priority: 2.1		CGI:			
Date Required: 04/03/2008		Special Instructions/Emergency Justification: Items having approval designator Q* shall be inspected at issue to field for suspect / counterfeit items.		Hjellum, Al (372-2540) 03/26/2008		Not Required per DRA							
<input type="checkbox"/> Mandatory <input checked="" type="checkbox"/> Desired				Requestor Date		Farris, Troy R (430-3136) 03/28/2008		Manager Date		Bores, John F (376-8131) 03/28/2008			
Suggested Vendor: Various				Engineer Date		Not Required per DRA		QA Engineer Date		Not Required per DRA			
				RadCon Date		Not Required per DRA		Environmental Date		Not Required per DRA			
				Industrial Health Date		Not Required per DRA		Chemical Management Date		Not Required per DRA			
QA Clauses: Items 1, 2, 3, and 7: N/A Items 4, 5, and 6: Material-on-hand (B clauses already satisfied)				Safety & Health Date		Not Required per DRA		Resp. Protection Date		Duncan, Vella (373-3852) 03/28/2008			
				Cost Account Manager Date		Shults, Duane L (373-4244) 03/28/2008		Material Coordinator Manager Date					
				Material Coordinator Date									

Item	Quantity	Estimated Cost	Safety Class	HAZMAT	MSDS	NRTL	Approval Desig.	Quality Level	QC Approval	Date/Qty Ordered	Order No.	Catalog No.
1	10	8.00	GS				Q*	0	JEAN.08	03/31/2008, 10.00	H00689101539	PC00032755
	Unit EACH	Delivery Date	Storage Level			B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)				Date/Qty Staged	Storage Bldg/Area	Storage Location
			B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)							04/14/2008, 10.00	2101HV/200E	R7-E2

Material Description: BOLT, HEAVY HEX, 5/8-11UNC-2A X 2 IN. LONG, ASTM A193 GR. B8						Additional Description:					
Purchasing Description:						Comments:					
Part Number *N/A			Equipment Type FASTENERS			Manufacturer NOT APPLICABLE			Drawing/ECN/Spec Number H-2-90718, Sht 25, PN196		

Item	Quantity	Estimated Cost	Safety Class	HAZMAT	MSDS	NRTL	Approval Desig.	Quality Level	QC Approval	Date/Qty Ordered	Order No.	Catalog No.
2	2	5.00	GS				N/A	0		04/14/2008, 2.00	MOH	FAB000353
	Unit EACH	Delivery Date	Storage Level			B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)				Date/Qty Staged	Storage Bldg/Area	Storage Location
			B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)							04/14/2008, 2.00	2101HV/200E	SHOP

Material Description: Gasket, 4" x 1/8" Thk for 4" 150# Flange, Compressed Fiber Non Asbestos						Additional Description: Garlock "Blue-Gard" Style 3000					
Purchasing Description:						Comments:					
Part Number NA			Equipment Type GASKET/SEALS/O-RING/PACK			Manufacturer Garlock			Drawing/ECN/Spec Number H-2-90718, Sht 25, PN172		

Item	Quantity	Estimated Cost	Safety Class	HAZMAT	MSDS	NRTL	Approval Desig.	Quality Level	QC Approval	Date/Qty Ordered	Order No.	Catalog No.
3	2	5.00	GS				Q*	0	JEAN.08	04/14/2008, 2.00	MOH	OTH0006606
	Unit	Delivery Date	Storage Level							Date/Qty Staged	Storage Bldg/Area	Storage Location

EACH		B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)				04/14/2008, 2.00		2101HV/200E		R7-E2		
Material Description: Nut, Winged 3/8"-16UNC Washer						Additional Description:						
Purchasing Description:						Comments:						
Part Number NA			Equipment Type FASTENERS			Manufacturer Various			Drawing/ECN/Spec Number H-2-90718, Sht 25, PN190			
Item	Quantity	Estimated Cost	Safety Class	HAZMAT	MSDS	NRTL	Approval Desig.	Quality Level	QC Approval	Date/Qty Ordered	Order No.	Catalog No.
4	1	250.00	GS				Q	3	JEA-14-08	04/14/2008, 1.00	MOH	0000627323
	Unit EACH	Delivery Date	Storage Level B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)				Date/Qty Staged 04/14/2008, 1.00	Storage Bldg/Area 2101HV/200E	Storage Location R7-E2			
Material Description: 40 cfm Weather Cover						Additional Description:						
Purchasing Description:						Comments: Material on hand and already green-tagged GS/QL-3. No QAIP required.						
Part Number 205			Equipment Type HVAC			Manufacturer Various			Drawing/ECN/Spec Number H-2-90718, Sht 25, PN205			
Item	Quantity	Estimated Cost	Safety Class	HAZMAT	MSDS	NRTL	Approval Desig.	Quality Level	QC Approval	Date/Qty Ordered	Order No.	Catalog No.
5	1	50.00	GS				Q	3	JE 4.14.08	04/14/2008, 1.00	MOH	OTH0006607
	Unit EACH	Delivery Date	Storage Level B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)				Date/Qty Staged 04/14/2008, 1.00	Storage Bldg/Area 2101HV/200E	Storage Location R7-E2			
Material Description: 40 cfm Breather Filter Bird Screen						Additional Description: Fabricate Bird Screen - 1/2" Stainless Expanded Metal						
Purchasing Description: See H-2-90718, Sht 16, PN228 and 229.						Comments: Item 5 may be either existing material located in 2101HV, or item purchased and fabricated by package CLO-WO-07-1618 (Supp 4). No QAIP required.						
Part Number NA			Equipment Type HVAC			Manufacturer Various			Drawing/ECN/Spec Number H-2-90718, Sht 25, PN 229			
Item	Quantity	Estimated Cost	Safety Class	HAZMAT	MSDS	NRTL	Approval Desig.	Quality Level	QC Approval	Date/Qty Ordered	Order No.	Catalog No.
6	1	4000.00	GS				Q	3	JE 4.14.08	04/14/2008, 1.00	MOH	OTH0006608
	Unit EACH	Delivery Date	Storage Level B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)				Date/Qty Staged 04/14/2008, 1.00	Storage Bldg/Area 2101HV/200E	Storage Location R7-E2			
Material Description: 4" dia filter mounting flange assembly (Flange Subassembly)						Additional Description: 40 cfm Filter Mounting Flange Sub Assy.						
Purchasing Description:						Comments: Material on hand and already green-tagged GS/QL-3. No QAIP required.						
Part Number NA			Equipment Type HVAC			Manufacturer Various			Drawing/ECN/Spec Number H-2-90718, Sht 25, PN223			
Item	Quantity	Estimated Cost	Safety Class	HAZMAT	MSDS	NRTL	Approval Desig.	Quality Level	QC Approval	Date/Qty Ordered	Order No.	Catalog No.
7	10	10.00	GS				Q*	0	JE 4.14.08	03/31/2008, 10.00	H00689101539	PC00032756
	Unit EACH	Delivery Date	Storage Level C - INDOORS (WEATHER TIGHT)				Date/Qty Staged 04/14/2008, 10.00	Storage Bldg/Area 2101HV/200E	Storage Location R7-E2			
Material Description: BOLT, HEAVY HEX, 5/8-11UNC-2A X 1-3/4 IN. LONG, ASTM A193 GR. B8						Additional Description:						
Purchasing Description:						Comments:						

Part Number N/A	Equipment Type FASTENERS	Manufacturer Any	Drawing/ECN/Spec Number H-2-90718, Sht 25, PN201
--------------------	-----------------------------	---------------------	---

**PARTIAL RELEASE**

Line # Released: \_\_\_\_\_  
 \_\_\_\_\_  
 Date Released: \_\_\_\_\_  
 Signature: \_\_\_\_\_

**RELEASED COMPLETE**

Line # Released: ALL Released To: STEVE WADE  
 Signature: Steve Wade 4-15-08

*S*

CH2M BILL OF MATERIAL

ORIGINAL

B.O.M. Suppl. 1

End Use: SX-101 Radial Filter		Wk. Pkg. No.: CLO-WO-08-0563		CACN/COA: 501956/FA30	
Date: 04/03/2008		Requestor: Gauck, Gregory J		Delivery Location: 2101 HV	
Date Required: <u>04/04/2008</u> <input type="checkbox"/> Mandatory <input checked="" type="checkbox"/> Desired		Special Instructions/Emergency Justification: Please assign to Duane Shults		Premium Freight <input type="checkbox"/> Priority: 2.1 CGI:	
Suggested Vendor: Various				Gauck, Gregory J (373-1779) 04/03/2008 Not Required per DRA	
QA Clauses: Items 1 Material-on-hand (B clauses already satisfied)				Requestor Date Manager Date Gauck, Gregory J (373-1779) 04/03/2008 Bores, John F (376-8131) 04/03/2008	
				Engineer Date QA Engineer Date Not Required per DRA Not Required per DRA	
				RadCon Date Environmental Date Not Required per DRA Not Required per DRA	
				Industrial Health Date Chemical Management Date Not Required per DRA Not Required per DRA	
				Safety & Health Date Resp. Protection Date Calmus, Ron (372-3385) 04/03/2008 Duncan, Vella (373-3852) 04/03/2008	
		Cost Account Manager Date Material Coordinator Manager Date Shults, Duane L (373-4244) 04/03/2008			
		Material Coordinator Date			

Item	Quantity	Estimated Cost	Safety Class	HAZMAT	MSDS	NRTL	Approval Desig.	Quality Level	QC Approval	Date/Qty Ordered	Order No.	Catalog No.
1	1	1268.60	GS				Q	3	4-8-08	04/03/2008, 1.00	10001582	0000628014
	Unit EACH	Delivery Date	Storage Level			Date/Qty Staged			Storage Bldg/Area	Storage Location		
			B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)			04/08/2008, 1.00			2101HV/200E	R7-13		
Material Description: DAMPER, 4 IN. DIA, BUTTERFLY VALVE, F/WYE ASSY						Additional Description: E2						
Purchasing Description:						Comments: This supplemental BOM is needed to support the work package for installation at SX-101. A butterfly valve with a lugged body is needed to replace the currently installed wafer body (single stud) as required by spool piece adapter flange used to install radial filter. Material is on-hand and green-tagged GS/QL-3. No QAIP required.						
Part Number: K-LOK 362-173 K-LOK 362-173			Equipment Type: VALVES		Manufacturer: KEYSTONE			Drawing/ECN/Spec Number: H-2-90718, Sht. 25				

RELEASED COMPLETE

Line # Released: AVL Released To: STEVE WADE  
 Signature: Steve Wade 4-15-08

SP

DOW CORNING

# DOW CORNING CORPORATION

## Material Safety Data Sheet

Page: 1 of 7

### DOW CORNING 200(R) FLUID, 100 CST.

#### 1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY

Dow Corning Corporation  
South Saginaw Road  
Midland, Michigan 48686

24 Hour Emergency Telephone: (989) 496-5900  
Customer Service: (989) 496-6000  
Product Disposal Information: (989) 496-6315  
CHEMTREC: (800) 424-9300

MSDS No.: 02638941

Revision Date: 2002/03/12

Generic Description: Silicone  
Physical Form: Liquid  
Color: Colorless  
Odor: Characteristic odor

NFPA Profile: Health 0 Flammability 1 Instability/Reactivity 0

Note: NFPA = National Fire Protection Association

#### 2. OSHA HAZARDOUS COMPONENTS

None present. This is not a hazardous material as defined in the OSHA Hazard Communication Standard.

#### 3. EFFECTS OF OVEREXPOSURE

##### Acute Effects

Eye: Direct contact may cause temporary redness and discomfort.  
Skin: No significant irritation expected from a single short-term exposure.  
Inhalation: No significant effects expected from a single short-term exposure.  
Oral: Low ingestion hazard in normal use.

##### Prolonged/Repeated Exposure Effects

Skin: No known applicable information.  
Inhalation: No known applicable information.  
Oral: No known applicable information.

##### Signs and Symptoms of Overexposure

No known applicable information.

##### Medical Conditions Aggravated by Exposure

No known applicable information.

The above listed potential effects of overexposure are based on actual data, results of studies performed upon similar compositions, component data and/or expert review of the product. Please refer to Section 11 for the detailed toxicology information.

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**DOW CORNING**

**DOW CORNING CORPORATION  
Material Safety Data Sheet**

Page: 2 of 7

**DOW CORNING 200(R) FLUID, 100 CST.**

**4. FIRST AID MEASURES**

Eye: Immediately flush with water.  
 Skin: No first aid should be needed.  
 Inhalation: No first aid should be needed.  
 Oral: No first aid should be needed.  
 Comments: Treat symptomatically.

**5. FIRE FIGHTING MEASURES**

Flash Point: > 214 °F / > 101.1 °C (Closed Cup)  
 Autoignition Temperature: Not determined.  
 Flammability Limits in Air: Not determined.  
 Extinguishing Media: On large fires use dry chemical, foam or water spray. On small fires use carbon dioxide (CO2), dry chemical or water spray. Water can be used to cool fire exposed containers.  
 Fire Fighting Measures: Self-contained breathing apparatus and protective clothing should be worn in fighting large fires involving chemicals. Use water spray to keep fire exposed containers cool. Determine the need to evacuate or isolate the area according to your local emergency plan.  
 Unusual Fire Hazards: None.

Hazardous Decomposition Products

Thermal breakdown of this product during fire or very high heat conditions may evolve the following hazardous decomposition products: Carbon oxides and traces of incompletely burned carbon compounds. Silicon dioxide. Formaldehyde.

**6. ACCIDENTAL RELEASE MEASURES**

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**DOW CORNING**

**DOW CORNING CORPORATION  
Material Safety Data Sheet**

Page: 3 of 7

**DOW CORNING 200(R) FLUID, 100 CST.**

**Containment/Clean up:** Determine whether to evacuate or isolate the area according to your local emergency plan. Observe all personal protection equipment recommendations described in Sections 5 and 8. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbant. Clean area as appropriate since some silicone materials, even in small quantities, may present a slip hazard. Final cleaning may require use of steam, solvents or detergents. Dispose of saturated absorbant or cleaning materials appropriately, since spontaneous heating may occur. Local, state and federal laws and regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which federal, state and local laws and regulations are applicable. Sections 13 and 15 of this MSDS provide information regarding certain federal and state requirements.

Note: See section 8 for Personal Protective Equipment for Spills. Call Dow Corning Corporation, (989) 496-5900, if additional information is required.

**7. HANDLING AND STORAGE**

Use with adequate ventilation. Avoid eye contact.  
Use reasonable care and store away from oxidizing materials.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**Component Exposure Limits**

There are no components with workplace exposure limits.

**Engineering Controls**

Local Ventilation: None should be needed.  
General Ventilation: Recommended.

**Personal Protective Equipment for Routine Handling**

Eyes: Use proper protection - safety glasses as a minimum.  
Skin: Washing at mealtime and end of shift is adequate.  
Suitable Gloves: No special protection needed.  
Inhalation: No respiratory protection should be needed.  
Suitable Respirator: None should be needed.

**Personal Protective Equipment for Spills**

Eyes: Use proper protection - safety glasses as a minimum.  
Skin: Washing at mealtime and end of shift is adequate.

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**DOW CORNING****DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 4 of 7

**DOW CORNING 200(R) FLUID, 100 CST.**

Inhalation/Suitable Respirator: No respiratory protection should be needed.

Precautionary Measures: Avoid eye contact. Use reasonable care.

Comments: When heated to temperatures above 150 degrees C in the presence of air, product can form formaldehyde vapors. Formaldehyde is a potential cancer hazard, a known skin and respiratory sensitizer, and an irritant to the eyes, nose, throat, skin, and digestive system. Safe handling conditions may be maintained by keeping vapor concentrations within the OSHA Permissible Exposure Limit for formaldehyde.

Note: These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Physical Form: Liquid  
 Color: Colorless  
 Odor: Characteristic odor  
 Specific Gravity @ 25°C: 0.965  
 Viscosity: 100 cSt  
 Freezing/Melting Point: Not determined.  
 Boiling Point: > 35C/95F  
 Vapor Pressure @ 25°C: Not determined.  
 Vapor Density: Not determined.  
 Solubility in Water: Not determined.  
 pH: Not determined.  
 Volatile Content: Not determined.

Note: The above information is not intended for use in preparing product specifications. Contact Dow Corning before writing specifications.

**10. STABILITY AND REACTIVITY**

Chemical Stability: Stable.  
 Hazardous Polymerization: Hazardous polymerization will not occur.  
 Conditions to Avoid: None.  
 Materials to Avoid: Oxidizing material can cause a reaction.

**11. TOXICOLOGICAL INFORMATION****Special Hazard Information on Components**

No known applicable information.

**12. ECOLOGICAL INFORMATION****Environmental Fate and Distribution**

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**DOW CORNING**

**DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

**DOW CORNING 200(R) FLUID, 100 CST.**

**Air:** This product is a high molecular weight liquid polymer which has a very low vapour pressure (<1 mm Hg). As a result it is unlikely to become an atmospheric contaminant unless generated as an aerosol.

**Water:** This product has a very low water solubility (< 100 ppb). As it has a specific gravity of < 1, if discharged to water, it will initially form a surface film. As the product is non volatile and has a high binding affinity for particulate matter, it will adsorb to particulates and sediment out.

**Soil:** If discharged to surface water, this product will bind to sediment. If discharged in effluent to a waste water treatment plant, the product is removed from the aqueous phase by binding to sewage sludge. If the sewage sludge is subsequently spread on soil, the silicone product is expected to degrade.

**Degradation:** This product, polydimethylsiloxane, degrades in soil abiotically to form smaller molecules. These in turn are either biodegraded in soil or volatilized into the air where they are broken down in the presence of sunlight. Under appropriate conditions, the ultimate degradation products are inorganic silica, carbon dioxide and water vapour. Due to the very low water solubility of this product, standard OECD protocols for ready and inherent biodegradability are not suitable for measuring the biodegradability of this product. The product is removed >80% during the sewage treatment process.

**Environmental Effects**

**Toxicity to Water Organisms:** Based on analogy to similar materials this product is expected to exhibit low toxicity to aquatic organisms.

**Toxicity to Soil Organisms:** Experiments show that when sewage sludge containing polydimethylsiloxane is added to soil, it has no effect on soil micro-organisms, earthworms or subsequent crops grown in the soil.

**Bioaccumulation:** This product is a liquid and is a high molecular weight polymer. Due to its physical size it is unable to pass through, or be absorbed by biological membranes. This has been confirmed by testing or analogy with similar products.

**Fate and Effects in Waste Water Treatment Plants**

This product or similar products has been shown to be non-toxic to sewage sludge bacteria.

**Ecotoxicity Classification Criteria**

Hazard Parameters (LC50 or EC50)	High	Medium	Low
Acute Aquatic Toxicity (mg/L)	<=1	>1 and <=100	>100
Acute Terrestrial Toxicity	<=100	>100 and <= 2000	>2000

This table is adapted from "Environmental Toxicology and Risk Assessment", ASTM STP 1179, p.34, 1993.

This table can be used to classify the ecotoxicity of this product when ecotoxicity data is listed above. Please read the other information presented in the section concerning the overall ecological safety of this material.

**13. DISPOSAL CONSIDERATIONS**

**RCRA Hazard Class (40 CFR 261)**

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**DOW CORNING****DOW CORNING CORPORATION  
Material Safety Data Sheet**

Page: 6 of 7

**DOW CORNING 200(R) FLUID, 100 CST.**

When a decision is made to discard this material, as received, is it classified as a hazardous waste? No

State or local laws may impose additional regulatory requirements regarding disposal.

Call Dow Corning Corporate Environmental Management, (989) 496-6315, if additional information is required.

**14. TRANSPORT INFORMATION****DOT Road Shipment Information (49 CFR 172.101)****Ocean Shipment (IMDG)**

Not subject to IMDG code.

**Air Shipment (IATA)**

Not subject to IATA regulations.

Call Dow Corning Transportation, (989) 496-8577, if additional information is required.

**15. REGULATORY INFORMATION**

Contents of this MSDS comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA Status: All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.

**EPA SARA Title III Chemical Listings****Section 302 Extremely Hazardous Substances:**

None.

**Section 304 CERCLA Hazardous Substances:**

None.

**Section 312 Hazard Class:**

Acute: No  
Chronic: No  
Fire: No  
Pressure: No  
Reactive: No

**Section 313 Toxic Chemicals:**

None present or none present in regulated quantities.

**Supplemental State Compliance Information**

California

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**DOW CORNING****DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 7 of 7

**DOW CORNING 200(R) FLUID, 100 CST.**

Warning: This product contains the following chemical(s) listed by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as being known to cause cancer, birth defects or other reproductive harm.

None known.

**Massachusetts**

No ingredient regulated by MA Right-to-Know Law present.

**New Jersey**

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
63148-62-9	> 60.0	Polydimethylsiloxane

**Pennsylvania**

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
63148-62-9	> 60.0	Polydimethylsiloxane

**16. OTHER INFORMATION**

Prepared by: Dow Corning Corporation

These data are offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

(R) indicates Registered Trademark

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# MATERIAL SAFETY DATA SHEET: SIMPLE GREEN®

also for : SIMPLE GREEN® SCRUBBING PAD

## I. PRODUCT & COMPANY INFORMATION

Version No. 10012  
Issue Date: January 2006

PRODUCT NAME: SIMPLE GREEN® ALL-PURPOSE CLEANER Page 1 of 4  
SIMPLE GREEN® CONCENTRATED CLEANER / DEGREASER / DEODORIZER  
SIMPLE GREEN® SCRUBBING PAD

COMPANY NAME: SUNSHINE MAKERS, INC.  
15922 Pacific Coast Highway  
Huntington Harbour, CA 92649 USA  
Telephone: 800-228-0709 • 562-795-6000  
Fax: 562-592-3034  
Website: www.simplegreen.com

MSDS # 012261

For 24-hour emergency, call Chem-Tel, Inc.: 800-255-3924

USE OF PRODUCT: An all purpose cleaner and degreaser used diluted in water for direct, spray, and dip tank procedures. (Scrubbing pad is used with water for manual scrubbing applications.)

## II. INGREDIENT INFORMATION

The only ingredient of Simple Green® with established exposure limits is undiluted 2-butoxyethanol (<6%) (Butyl Cellosolve; CAS No. 111-76-2); the ACGIH TLV-TWA is 20 ppm (97 mg/m<sup>3</sup>).

Based upon chemical analysis, Simple Green® contains no known EPA priority pollutants, heavy metals, or chemicals listed under RCRA, CERCLA, or CWA. Analysis by TCLP (Toxicity Characteristic Leaching Procedure) according to RCRA revealed no toxic organic or inorganic constituents.

All components of Simple Green® are listed on the TSCA Chemical Substance Inventory.

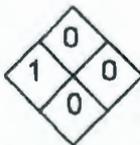
## III. HAZARDS IDENTIFICATION

UN Number: Not required  
Dangerous Goods Class: Nonhazardous

NJ TRADE SECRET REGISTRATION NUMBERS	
80100235-5000p	80100235-5005p
80100235-5001p	80100235-5006p
80100235-5002p	80100235-5007p
80100235-5003p	80100235-5008p
80100235-5004p	80100235-5009p

### Hazard Rating (NFPA/HMIS)

Health = 1\*      Reactivity = 0  
Fire = 0          Special = 0



### Rating Scale

0 = minimal      1 = slight  
2 = moderate    3 = serious  
4 = severe

\*Mild eye irritant, non-mutagenic and non-carcinogenic. None of the ingredients in Simple Green® are regulated or listed as cancer agents by Federal OSHA, NTP, or IARC.

SP

**IV. FIRST AID MEASURES****SYMPTOMS OF OVEREXPOSURE AND FIRST AID TREATMENT**

- Eye contact:** Reddening may develop. Immediately rinse the eye with large quantities of cool water; continue 10-15 minutes or until the material has been removed; be sure to remove contact lenses, if present, and to lift upper and lower lids during rinsing. Get medical attention if irritation persists.
- Skin contact:** Minimal effects, if any, rinse skin with water, rinse shoes and launder clothing before reuse. Reversible reddening may occur in some dermal-sensitive users; thoroughly rinse area and get medical attention if reaction persists.
- Swallowing:** Essentially non-toxic. Give several glasses of water to dilute; do not induce vomiting. If stomach upset occurs, consult physician.
- Inhalation:** Non-toxic. Exposures to concentrate-mist may cause mild irritation of nasal passages or throat; remove to fresh air. Get medical attention if irritation persists.

**V. FIRE FIGHTING MEASURES**

Simple Green® is stable, not flammable, and will not burn.

- |                                   |   |                      |
|-----------------------------------|---|----------------------|
| Flash Point/Auto-Ignition:        | Not flammable.  | <b>MSDS # 012261</b> |
| Flammability Limits:              | Not flammable.  |                      |
| Extinguishing Media:              | Not flammable/nonexplosive. No special procedures required. |                      |
| Special Fire Fighting Procedures: | None required.  |                      |

**VI. ACCIDENTAL RELEASE MEASURES**

Recover usable material by convenient method; residual may be removed by wipe or wet mop. If necessary, unrecoverable material may be washed to drain with large quantities of water.

**VII. HANDLING, STORAGE & TRANSPORT INFORMATION**

No special precautions are required. **This product is non-hazardous for storage and transport according to the U.S. Department of Transportation Regulations.** Simple Green® requires no special labeling or placarding to meet U.S. Department of Transportation requirements.

UN Number: Not required

Dangerous Goods Class: Non-hazardous

**VIII. EXPOSURE CONTROLS**

**Exposure Limits:** The Simple Green® formulation presents no health hazards to the user when used according to label directions for its intended purposes. Mild skin and eye irritation is possible (please see Eye contact and Skin contact in Section IV.).

**Ventilation:** No special ventilation is required during use.

**Human Health Effects or Risks from Exposure:** Adverse effects on human health are not expected from Simple Green®, based upon twenty years of use without reported adverse health incidence in diverse population groups, including extensive use by inmates of U.S. Federal prisons in cleaning operations.

Simple Green® is a mild eye irritant; mucous membranes may become irritated by concentrate-mist.

Simple Green® is not likely to irritate the skin in the majority of users. Repeated daily application to the skin without rinsing, or continuous contact of Simple Green® on the skin may lead to temporary, but reversible, irritation.

**Medical Conditions Aggravated by Exposure:** No aggravation of existing medical conditions is expected; dermal sensitive users may react to dermal contact by Simple Green®.

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**IX. PERSONAL PROTECTION**

<b>Precautionary Measures:</b>	No special requirements under normal use conditions.
<b>Eye Protection:</b>	<b>Caution, including reasonable eye protection, should always be used to avoid eye contact where splashing may occur.</b>
<b>Skin Protection:</b>	No special precautions required; rinse completely from skin after contact
<b>Respiratory Protection:</b>	No special precautions required.
<b>Work and Hygienic Practices:</b>	No special requirements. Wash or rinse hands before touching eyes or contact lenses.

**X. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance/odor:</b>	Translucent green liquid with characteristic sassafras odor. (Scrubber is green fibrous rectangle.)		
<b>Specific Gravity:</b>	1.0257	<b>Vapor Pressure:</b>	17 mm Hg @ 20 °C; 22 mm Hg @ 25 °C
<b>pH of concentrate:</b>	9.5	<b>Vapor Density:</b>	1.3 (air = 1)
<b>Evaporation:</b>	>1 (butyl acetate = 1)	<b>Density:</b>	8.5 lbs./gallon
<b>Boiling Point:</b>	110 °C (231 °F)		
<b>Freezing Point:</b>	-9 °C (16 °F) If product freezes, it will reconstitute without loss of efficacy when brought back to room temperature and agitated.		
<b>VOC Composite Partial Pressure:</b>	0.006 mm Hg @ 20 °C		
<b>Volatile Organic Compounds (VOCs):</b>	7.96 g/L per ASTM Method 3960-90. Per EPA Method 24, VOCs are 5.9% and product must be diluted at least 1 part of water to 1 part Simple Green® in order to meet CARB 2005 VOC regulations -or 1 part Simple Green to 3 parts water to meet SCAQMD Rule 1171 & Rule 1122 and BAAQMD Regulation 8-16 VOC requirements for solvent cleaning operations.		
<b>Water Solubility:</b>	Completely soluble in water. The higher salt concentrations in marine ecosystems will lead to complexes with Simple Green® that may become visible at ratios above one part Simple Green® to 99 parts seawater.		
<b>Ash Content:</b>	At 600 °F: 1.86% by weight.		
<b>Nutrient Content:</b>	Nitrogen: <1.0% by weight (fusion and qualitative test for ammonia). Phosphorus: 0.3% by formula. Sulfur: 0.6% by weight (barium chloride precipitation method).		

**Detection:** Simple Green® has a characteristic sassafras odor that is not indicative of any hazardous situation.

**XI. STABILITY AND REACTIVITY INFORMATION**

Nonreactive. Simple Green® is stable, even under fire conditions, and will not react with water or oxidizers. Hazardous polymerization will not occur.

**XII. TOXICOLOGICAL INFORMATION****Nonhuman Toxicity****Acute Mortality Studies:**

Oral LD<sub>50</sub> (rat): >5.0 g/kg body weight // Dermal LD<sub>50</sub> (rabbit): >2.0 g/kg body weight

**Dermal Irritation:** Only mild, but reversible, irritation was found in a standard 72-hr test on rabbits. A value of 0.2 (non-irritating) was found on a scale of 8.

**Eye Irritation:** With or without rinsing with water, the irritation scores in rabbits at 24 hours did not exceed 15 (mild irritant) on a scale of 110.

**Subchronic dermal effects:** No adverse effects, except reversible dermal irritation, were found in rabbits exposed to Simple Green® (up to 2.0 g/kg/day for 13 weeks) applied to the skin of 25 males and 25 females. Only female body weight gain was affected. Detailed microscopic examination of all major tissues showed no adverse changes.

**Fertility Assessment by Continuous Breeding:** The Simple Green® formulation had no adverse effect on fertility and reproduction in CD-1 mice with continuous administration for 18 weeks, and had no adverse effect on the reproductive performance of their offspring.

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### XIII. BIODEGRADABILITY AND ENVIRONMENTAL TOXICITY INFORMATION

#### Biodegradability:

Simple Green® is readily decomposed by naturally occurring microorganisms. The biological oxygen demand (BOD), as a percentage of the chemical oxygen demand (COD), after 4, 7, and 11 days was 56%, 60%, and 70%, respectively. Per OECD Closed Bottle Test, Simple Green® meets OECD and EPA recommendations for ready biodegradability.

In a standard biodegradation test with soils from three different countries, Butyl Cellosolve reached 50% degradation in 6 to 23 days, depending upon soil type, and exceeded the rate of degradation for glucose which was used as a control for comparison.

#### Environmental Toxicity Information:

Simple Green® is considered practically non-toxic per EPA's aquatic toxicity scale. Simple Green® is non-lethal to any of the marine and estuarine test animals listed in the following table at concentrations below 200 mg/L (0.02%). This table shows the Simple Green® concentrations that are likely to be lethal to 50% of the exposed organisms.

	LC <sub>50</sub> in mg/L (ppm)	
	48-hour	96-hour
<u>Marine Fish:</u>		
Mud minnow ( <i>Fundulus heteroclitus</i> )	1690	1574
Whitebait ( <i>Galaxias maculatus</i> )	210	210
<u>Marine/Estuarine Invertebrates:</u>		
Brine Shrimp ( <i>Artemia salina</i> )	610	399
Grass Shrimp ( <i>Palaemonetes pugio</i> )	270	220
Green-lipped Mussel ( <i>Perna canaliculus</i> )	220	220
Mud Snail ( <i>Potamopyrgus estuarinus</i> )	410	350

MSDS # 012261

### XIV. DISPOSAL CONSIDERATIONS

Simple Green® is fully water soluble and biodegradable and will not harm sewage-treatment microorganisms if disposal by sewer or drain is necessary. Dispose of in accordance with all applicable local, state, and federal laws.

### XV. OTHER INFORMATION

**Containers:** Simple Green® residues can be completely removed by rinsing with water; the container may be recycled or applied to other uses.

**Electrical Wiring Compatibility:** Polyimide insulated wiring is not affected by exposure to Simple Green®. After immersion in Simple Green® for 14 days at 74°F, the 61 cm piece of polyamide insulated wire passed a one minute dielectric proof test at 2500 volts (ASTM D-149).

**Contact Point:** Sunshine Makers, Inc., Research and Development Division: 562-795-6000.

**National Stock Numbers:**

PART#	NSN	SIZE	PART#	NSN	SIZE
13012	7930-01-342-5315	24 oz. spray (12/cs)	13016	7930-01-342-5317	15 gal.
13005	7930-01-306-8369	1 gal. (6/cs)	13008	7930-01-342-4145	55 gal.
13006	7930-01-342-5316	5 gal.	Scrubbing Pad: 10224	7930-01-346-9148	Each (24/cs)

#### \*\*\* NOTICE \*\*\*

All information appearing herein is based upon data obtained by the manufacturer & recognized technical sources. Judgments as to the suitability of information herein for purchaser's purposes are necessarily purchaser's responsibility. Therefore, although reasonable care has been taken in the preparation of this information, Sunshine Makers, Inc. or its distributors extends no warranties, makes no representations and assumes no responsibility as to the suitability of such information for application to purchaser's intended purposes or for consequences of its use.



MSDS 012664B

**WD-40****MATERIAL SAFETY DATA SHEET****I. PRODUCT IDENTIFICATION**

Manufacturer:	WD-40 Company	Telephone:	
Address:	1061 Cudahy Place (92110) P.O. Box 80607 San Diego, California 92138-0607	Emergency only:	1-(800) 424-9300 (CHEMTREC)
		Information:	(619) 275-1400
		Chemical Name:	Organic Mixture
		Trade Name:	WD-40 Aerosol

**II. HAZARDOUS INGREDIENTS**

Chemical Name	CAS Number	%	Exposure Limit ACGIH/OSHA
Aliphatic Petroleum Distillates	8052-41-3	45-50	100 ppm PEL
Petroleum Base Oil	64742-85-0	15-25	5 mg/M <sup>3</sup> TWA (mist)
LVP Hydrocarbon Fluid	64742-47-8	12-18	1200 mg/M <sup>3</sup> TWA
Carbon Dioxide	124-38-9	2-3	5000 ppm PEL
Non-hazardous Ingredients		< 10	

**III. PHYSICAL DATA**

Boiling Point:	323°F (minimum)	Evaporation Rate:	Not determined
Vapor Density (air=1):	Greater than 1	Vapor Pressure:	110 ±5 PSI @ 70°F
Solubility in Water:	insoluble	Appearance:	Light amber
Specific Gravity (H <sub>2</sub> O=1):	0.817 @ 72°F	Odor:	Characteristic odor
Percent Volatile (volume):	74%	VOC:	412 grams/liter (49.5%)

**IV. FIRE AND EXPLOSION**

Flash Point:	131°F Tag Closed Cup
Flammable Limits:	(Solvent Portion) [LeI] 1.0% [UeI] 6.0%
Extinguishing Media:	CO <sub>2</sub> , Dry Chemical, Foam.
Special Fire Fighting Procedures:	Contents Under Pressure
Unusual Fire and Explosion Hazards:	FLAMMABLE - U.F.C. level 3 AEROSOL

**V. HEALTH HAZARD / ROUTE(S) OF ENTRY**

<b>Threshold Limit Value</b>	Aliphatic Petroleum Distillates (Stoddard Solvent) lowest TLV (ACGIH 100 ppm.)
<b>Symptoms of Overexposure</b>	
<b>Inhalation (Breathing):</b>	May cause anesthesia, headache, dizziness, nausea and upper respiratory irritation.
<b>Skin contact:</b>	May cause drying of skin and/or irritation.
<b>Eye contact:</b>	May cause irritation, tearing and redness.
<b>Ingestion (Swallowed):</b>	May caused irritation, nausea, vomiting and diarrhea.
<b>First Aid Emergency Procedures</b>	
<b>Ingestion (Swallowed):</b>	Do not induce vomiting, seek medical attention.
<b>Eye Contact:</b>	Immediately flush eyes with large amounts of water for 15 minutes.
<b>Skin Contact:</b>	Wash with soap and water.
<b>Inhalation (Breathing):</b>	Remove to fresh air. Give artificial respiration if necessary. If breathing is difficult, give oxygen.
	Pre-existing medical conditions such as eye, skin and respiratory disorders may be aggravated by exposure.
<b>DANGER!</b>	
<b>Aspiration Hazard:</b>	If swallowed, can enter lungs and may cause chemical pneumonitis. Do not induce vomiting. Call Physician immediately.
<b>Suspected Cancer Agent</b>	The components in this mixture have been found to be noncarcinogenic by NTP, IARC and OSHA
Yes ___ No <u>X</u>	

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**VI. REACTIVITY DATA**

Stability:	Stable <u>X</u>	Unstable <u>    </u>
Conditions to avoid:	NA	
Incompatibility:	Strong oxidizing agents	
Hazardous decomposition products:	Thermal decomposition may yield carbon monoxide and/or carbon dioxide	
Hazardous polymerization:	May occur <u>    </u>	Will not occur <u>X</u>

**VII. SPILL OR LEAK PROCEDURES**

<b>Spill Response Procedures</b>	
Spill unlikely from aerosol cans. Leaking cans should be placed in plastic bag or open pail until pressure has dissipated.	
<b>Waste Disposal Method</b>	
Empty aerosol cans should not be punctured or incinerated; bury in land fill. Liquid should be incinerated or buried in land fill. Dispose of in accordance with local, state and federal regulations.	

**VIII. SPECIAL HANDLING INFORMATION**

Ventilation:	Sufficient to keep solvent vapor less than TLV.
Respiratory Protection:	Advised when concentrations exceed TLV.
Protective Gloves:	Advised to prevent possible skin irritation.
Eye Protection:	Approved eye protections to safeguard against potential eye contact, irritation or injury.
Other Protective Equipment:	None required.

**IX. SPECIAL PRECAUTIONS**

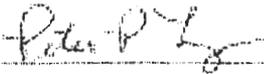
Keep from sources of ignition. Avoid excessive inhalation of spray particles, do not take internally. Do not puncture, incinerate or store container above 120°F. Exposure to heat may cause bursting. Keep can away from electrical current or battery terminals. Electrical arcing can cause burn-through (puncture) which may result in flash fire, causing serious injury. Keep from children.
--

**X. TRANSPORTATION DATA (49 CFR 172.101)**

<b>Domestic Surface</b>	
Description:	Consumer Commodity
Hazard Class:	ORM-D
ID No:	None
Label Required:	Consumer commodity (ORM-D)

**XI. REGULATORY INFORMATION**

All ingredients for this product are listed on the TSCA inventory.	
SARA Title III chemicals:	None
California Prop 65 chemicals:	None
CERCLA reportable quantity:	None
RCRA hazardous waste no:	D001 (Ignitable)

SIGNATURE: Peter Fougner  TITLE: Director of Global Quality Assurance

REVISION DATE: December, 2004 SUPERSEDES: November, 2003

NA: Not applicable NDA: No data available (< = Less than > = More than)

We believe the statements, technical information and recommendations contained herein are reliable. However, the data is provided without warranty, expressed or implied. It is the user's responsibility both to determine safe conditions for use of this product and assume loss, damage or expense, direct or consequential, arising from its use. Before using product, read label.

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KANO LABORATORIES, INC.  
SAFETY DATA SHEET

## SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

**Manufacturer:** Kano Laboratories, Inc.  
1000 E. Thompson Lane  
Nashville, TN 37211  
**Information Phone Number:** (615) 833-4101  
**Fax:** (615) 833-5790 **Emergency:** 800-424-9300 (Chemtrec)  
**Website:** www.kanolaboratories.com

## HMIS Hazard Rating

<input checked="" type="checkbox"/>	HEALTH	1
<input checked="" type="checkbox"/>	FLAMMABILITY	2
<input type="checkbox"/>	REACTIVITY	0
<input type="checkbox"/>	PERSONAL PROTECTION	X

**Product Name:** KROIL  
**MSDS Date of Preparation:** 6/7/05  
**Product Use:** Penetrant/Lubricant for Industrial Use

## SECTION 2: HAZARDS IDENTIFICATION

Slightly reddish liquid with a refreshing odor.

## EMERGENCY OVERVIEW

**WARNING!** Combustible Liquid and Vapor. May cause eye and skin irritation. May be harmful if absorbed through the skin. Inhalation of vapors or mist may cause respiratory irritation and central nervous system effects such as headache, dizziness, nausea and vomiting. Harmful or fatal if swallowed. Aspiration into the lungs during ingestion or vomiting may cause lung damage. May cause chronic effects.

**Potential Health Effects:**

**Eye:** May cause eye irritation with redness, tearing and stinging. Corneal injury is possible if not promptly removed.

**Skin:** May cause mild irritation with redness, rash, swelling. Prolonged or repeated contact may result in defatting and dermatitis. May be absorbed through the skin with effects similar to inhalation and ingestion.

**Inhalation:** Inhalation of vapors or mists may cause mucous membrane and upper respiratory tract irritation and central nervous system depression. Symptoms may include burning sensation, coughing, wheezing, sore throat, shortness of breath, headache, dizziness, drowsiness, nausea, vomiting, depressed respiration and heart rate, heart rhythm irregularities and unconsciousness.

**Ingestion:** Swallowing may cause gastrointestinal irritation with abdominal pain, nausea, vomiting and diarrhea and central nervous system depression with symptoms including headache, dizziness, intoxication, weakness, respiratory failure, convulsions, cardiovascular collapse and pulmonary edema. Aspiration into the lungs during ingestion or vomiting may cause lung damage.

**Chronic Hazards:** Prolonged or repeated exposure may cause damage to the central nervous system, blood, kidney and liver. This product contains chemicals that in animal studies caused harm to the developing fetus, but only at exposure levels that harm the pregnant animal. There is no evidence of adverse fetal or reproductive effects in humans.

**Carcinogen Status:** None of the components of this product at greater than 0.1% are listed as carcinogens by OSHA, IARC or NTP.

**Medical Conditions Aggravated by Exposure:** Pre-existing eye, skin, respiratory, heart, central nervous system, liver and kidney disorders.

**SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical Name	CAS#	%
Severely Hydrotreated Petroleum Distillates	64742-52-5	30-50
Light Petroleum Distillates	64742-95-6/64742-88-7/64742-47-8	30-50
Aliphatic Alcohols	78-92-2/123-42-2	1-5
Glycol Ether	111-76-2	1-5
Proprietary Ingredients	Proprietary	5-15

**SECTION 4: FIRST AID MEASURES**

**Eye:** Rinse thoroughly with water for at least 15 minutes, holding the eye lids open to be sure the material is washed out. Get immediate medical attention.

**Skin:** Remove contaminated clothing. Wash contact area thoroughly with soap and water. Get medical attention if irritation or symptoms of exposure develop. Launder clothing before re-use.

**Inhalation:** Remove victim to fresh air. Give artificial respiration if needed. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

**Ingestion:** DO NOT induce vomiting. Keep the victim calm and warm. Never give anything by mouth to an unconscious or drowsy person. Get immediate medical attention.

**SECTION 5: FIRE FIGHTING MEASURES**

**Flash Point:** 124°F (51°C) COC

**Flammable Limits:** LEL: 0.9%  
UEL: 10.6%

**Autoignition Temperature:** Not Determined

**Extinguishing Media:** Use carbon dioxide, dry chemical or foam. Water may be ineffective but can be used to cool containers and structures.

**Special Fire Fighting Procedures:** Wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing. Cool fire exposed containers with water.

**Unusual Fire Hazards:** Vapors are heavier than air and may travel along surfaces to remote ignition sources and flash back. Never use welding or cutting torch on or near containers (even empty) because product can ignite explosively. Combustion products may be hazardous.

**Hazardous Decomposition Products:** Oxides of carbon, organic compounds, smoke and fumes.

**SECTION 6: ACCIDENTAL RELEASE MEASURES**

**Spill:** Remove all ignition sources such as open flames, spark producing equipment, pilot lights, etc. Wear appropriate protective clothing to prevent eye and skin contact including impervious gloves, safety goggles and respirator if needed (refer to Section 8 for specific recommendations). Ventilate area. Cover with an inert absorbent material and collect into an appropriate container for disposal. Report spills and releases as required to appropriate authorities.

**SECTION 7: HANDLING AND STORAGE**

**Handling:** Avoid breathing vapors, aerosols and mists. Use with adequate ventilation. Avoid contact with the eyes, skin and clothing. Wash exposed skin thoroughly with soap and water after use. Keep product away from heat, sparks, flames and all other sources of ignition. No smoking in storage or use areas. Keep containers closed when not in use. Do not cut, braze, solder, grind or weld empty containers. Do not reuse containers. Follow all MSDS precautions in handling empty containers.

**Storage:** Store in a cool, dry, well-ventilated location away from incompatible materials. Keep containers closed.

**SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

Chemical Name	Exposure Limits
Severely Hydrotreated Petroleum Distillates	5 mg/m <sup>3</sup> OSHA PEL-TWA 5 mg/m <sup>3</sup> ACGIH TLV-TWA 10 mg/m <sup>3</sup> ACGIH TLV-STEL
Light Petroleum Distillates	100 ppm OSHA PEL-TWA 100 ppm ACGIH TLV-TWA
Aliphatic Alcohol	150 ppm OSHA PEL-TWA 100 ppm ACGIH TLV-TWA
Aliphatic Alcohol	50 ppm OSHA PEL-TWA 50 ppm ACGIH TLV-TWA
Glycol Ether	50 ppm OSHA PEL-TWA 20 ppm ACGIH TLV-TWA
Proprietary Ingredients	None Established

**Ventilation:** Use with adequate general or local exhaust ventilation to maintain concentrations below the occupational exposure limits. Use explosion proof electrical equipment and wiring where required.

**Respiratory Protection:** If needed, a NIOSH approved respirator with organic vapor cartridges may be used. For higher exposures, a supplied air respirator may be required. Respirator selection and use should be based on contaminant type, form and concentration. Follow OSHA 1910.134, ANSI Z88.2 and good Industrial Hygiene practice.

**Skin Protection** Impervious gloves are recommended when needed to avoid skin contact. Based on available test data, 4H or Silver Shield gloves are suggested.

**Eye Protection:** Chemical safety goggles recommended.

**Other Protective Equipment:** Impervious clothing as required to prevent skin contact and contamination of personal clothing. Suitable eye wash and washing facilities should be available in the work area.

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance and Odor:** Slightly reddish liquid with a refreshing odor.

**pH:** 6-7

**Boiling Point:** 258°F

**Vapor Pressure:** 12 mm Hg @ 20°C (aliphatic alcohol)

**Vapor Density (air =1):** Greater than 1

**Specific Gravity:** 0.87

**Melting Point:** Not applicable

**Water Solubility:** Negligible

**Evaporation Rate (ether=1):** Less than 1

**SECTION 10: STABILITY AND REACTIVITY**

**Stability:** Stable under normal conditions of storage or use.

**Incompatibility/Conditions to Avoid:** Avoid strong oxidizing agents, reducing agents, acids, bases, amines, alkanolamines, ammonia, chlorinated compounds. Avoid heat, sparks, flames and all other sources of ignition.

# MSDS # 014258

KROIL  
6/7/05

**Hazardous Decomposition Products:** Combustion will produce oxides of carbon, organic compounds, smoke and fumes.

**Hazardous Polymerization:** Will not occur.

## SECTION 11: TOXICOLOGICAL INFORMATION

Toxicological testing has not been performed on this product as a mixture.

The calculated acute toxicity values, as determined by the DOT and other agency standard formula are: Oral LD50 = 2270; Dermal LD50 = 1500 mg/kg. Kroil is not classified as toxic under workplace or transportation criteria.

## SECTION 12: ECOLOGICAL INFORMATION

No data available.

## SECTION 13: DISPOSAL INFORMATION

Dispose in accordance with all local, state and federal regulations.

## SECTION 14: TRANSPORT INFORMATION

**DOT Shipping Name:** Exempted from Hazmat when packaged in non-bulk containers (<119 gal) and shipped ground

**DOT Hazard Class/Packing Group:** None

**UN Number:** None

**DOT Labels Required (49CFR172.101):** None

**Hazardous Substance (49CFR172.101):** None

**Reportable Quantity:** None

**DOT Marine Pollutants:** This product does not contain marine pollutants as defined in 49CFR 171.8.

**IATA Shipping Name:** Flammable liquid, n.o.s. (Aliphatic Alcohols, Petroleum Distillates)

**IATA Hazard Class/Packing Group:** 3, III

**UN Number:** UN1993

**IATA Hazard Labels Required:** Class 3

## SECTION 15: REGULATORY INFORMATION

### U.S. FEDERAL REGULATIONS:

**CERCLA 103 Reportable Quantity:** This product is not subject to CERCLA reporting requirements, however, oil spills are reportable to the National Response Center under the Clean Water Act and many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

MSDS # 014258

KROIL  
6/7/05

**SARA TITLE III:**

**Hazard Category for Section 311/312:** Acute Health, Chronic Health, Fire Hazard

**Section 313 Toxic Chemicals:** This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirements:

Aliphatic Alcohol	78-92-2	1-5%
Glycol Ether	111-76-2	1-5%
1,2,4-Trimethylbenzene	95-63-6	5 - < 5%

**Section 302 Extremely Hazardous Substances (TPQ):** None

**EPA Toxic Substances Control Act (TSCA) Status:** All of the components of this product are listed on the TSCA inventory.

**SECTION 16: OTHER INFORMATION**

**HMIS Ratings:** Health - 1      Flammability - 2      Reactivity - 0  
**NFPA Ratings:** Health - 1      Flammability - 2      Reactivity - 0

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=====  
The information contained herein has been developed based upon current available scientific data. New information may be developed from time to time which may render the conclusions of this report obsolete. Therefore, no warranty is extended as to the applicability of this information to the user's intended purpose or the consequences of its use or misuse.

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**Fax:** (615) 833-5790 **Emergency:** 800-424-9300 (Chemtrec)  
**Website:** www.kanolaboratories.com

HMIS Hazard Rating

HEALTH	1
FLAMMABILITY	2
REACTIVITY	0
PERSONAL PROTECTION	X

**Product Name:** KROIL  
**MSDS Date of Preparation:** 6/7/05  
**Product Use:** Penetrant/Lubricant for Industrial Use

**SECTION 2: HAZARDS IDENTIFICATION**

Slightly reddish liquid with a refreshing odor.

**EMERGENCY OVERVIEW**

**WARNING!** Combustible Liquid and Vapor. May cause eye and skin irritation. May be harmful if absorbed through the skin. Inhalation of vapors or mist may cause respiratory irritation and central nervous system effects such as headache, dizziness, nausea and vomiting. Harmful or fatal if swallowed. Aspiration into the lungs during ingestion or vomiting may cause lung damage. May cause chronic effects.

**Potential Health Effects:**

**Eye:** May cause eye irritation with redness, tearing and stinging. Corneal injury is possible if not promptly removed.

**Skin:** May cause mild irritation with redness, rash, swelling. Prolonged or repeated contact may result in defatting and dermatitis. May be absorbed through the skin with effects similar to inhalation and ingestion.

**Inhalation:** Inhalation of vapors or mists may cause mucous membrane and upper respiratory tract irritation and central nervous system depression. Symptoms may include burning sensation, coughing, wheezing, sore throat, shortness of breath, headache, dizziness, drowsiness, nausea, vomiting, depressed respiration and heart rate, heart rhythm irregularities and unconsciousness.

**Ingestion:** Swallowing may cause gastrointestinal irritation with abdominal pain, nausea, vomiting and diarrhea and central nervous system depression with symptoms including headache, dizziness, intoxication, weakness, respiratory failure, convulsions, cardiovascular collapse and pulmonary edema. Aspiration into the lungs during ingestion or vomiting may cause lung damage.

**Chronic Hazards:** Prolonged or repeated exposure may cause damage to the central nervous system, blood, kidney and liver. This product contains chemicals that in animal studies caused harm to the developing fetus, but only at exposure levels that harm the pregnant animal. There is no evidence of adverse fetal or reproductive effects in humans.

**Carcinogen Status:** None of the components of this product at greater than 0.1% are listed as carcinogens by OSHA, IARC or NTP.

**Medical Conditions Aggravated by Exposure:** Pre-existing eye, skin, respiratory, heart, central nervous system, liver and kidney disorders.

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**SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical Name	CAS#	%
Severely Hydrotreated Petroleum Distillates	64742-52-5	30-50
Light Petroleum Distillates	64742-95-6/64742-88-7/64742-47-8	30-50
Aliphatic Alcohols	78-92-2/123-42-2	1-5
Glycol Ether	111-76-2	1-5
Proprietary Ingredients	Proprietary	5-15

**SECTION 4: FIRST AID MEASURES**

**Eye:** Rinse thoroughly with water for at least 15 minutes, holding the eye lids open to be sure the material is washed out. Get immediate medical attention.

**Skin:** Remove contaminated clothing. Wash contact area thoroughly with soap and water. Get medical attention if irritation or symptoms of exposure develop. Launder clothing before re-use.

**Inhalation:** Remove victim to fresh air. Give artificial respiration if needed. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

**Ingestion:** DO NOT induce vomiting. Keep the victim calm and warm. Never give anything by mouth to an unconscious or drowsy person. Get immediate medical attention.

**SECTION 5: FIRE FIGHTING MEASURES**

**Flash Point:** 124°F (51°C) COC

**Flammable Limits:** LEL: 0.9%  
UEL: 10.6%

**Autoignition Temperature:** Not Determined

**Extinguishing Media:** Use carbon dioxide, dry chemical or foam. Water may be ineffective but can be used to cool containers and structures.

**Special Fire Fighting Procedures:** Wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing. Cool fire exposed containers with water.

**Unusual Fire Hazards:** Vapors are heavier than air and may travel along surfaces to remote ignition sources and flash back. Never use welding or cutting torch on or near containers (even empty) because product can ignite explosively. Combustion products may be hazardous.

**Hazardous Decomposition Products:** Oxides of carbon, organic compounds, smoke and fumes.

**SECTION 6: ACCIDENTAL RELEASE MEASURES**

**Spill:** Remove all ignition sources such as open flames, spark producing equipment, pilot lights, etc. Wear appropriate protective clothing to prevent eye and skin contact including impervious gloves, safety goggles and respirator if needed (refer to Section 8 for specific recommendations). Ventilate area. Cover with an inert absorbent material and collect into an appropriate container for disposal. Report spills and releases as required to appropriate authorities.

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**SECTION 7: HANDLING AND STORAGE**

**Handling:** Avoid breathing vapors, aerosols and mists. Use with adequate ventilation. Avoid contact with the eyes, skin and clothing. Wash exposed skin thoroughly with soap and water after use. Keep product away from heat, sparks, flames and all other sources of ignition. No smoking in storage or use areas. Keep containers closed when not in use. Do not cut, braze, solder, grind or weld empty containers. Do not reuse containers. Follow all MSDS precautions in handling empty containers.

**Storage:** Store in a cool, dry, well-ventilated location away from incompatible materials. Keep containers closed.

**SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

Chemical Name	Exposure Limits
Severely Hydrotreated Petroleum Distillates	5 mg/m <sup>3</sup> OSHA PEL-TWA 5 mg/m <sup>3</sup> ACGIH TLV-TWA 10 mg/m <sup>3</sup> ACGIH TLV-STEL
Light Petroleum Distillates	100 ppm OSHA PEL-TWA 100 ppm ACGIH TLV-TWA
Aliphatic Alcohol	150 ppm OSHA PEL-TWA 100 ppm ACGIH TLV-TWA
Aliphatic Alcohol	50 ppm OSHA PEL-TWA 50 ppm ACGIH TLV-TWA
Glycol Ether	50 ppm OSHA PEL-TWA 20 ppm ACGIH TLV-TWA
Proprietary Ingredients	None Established

**Ventilation:** Use with adequate general or local exhaust ventilation to maintain concentrations below the occupational exposure limits. Use explosion proof electrical equipment and wiring where required.

**Respiratory Protection:** If needed, a NIOSH approved respirator with organic vapor cartridges may be used. For higher exposures, a supplied air respirator may be required. Respirator selection and use should be based on contaminant type, form and concentration. Follow OSHA 1910.134, ANSI Z88.2 and good Industrial Hygiene practice.

**Skin Protection** Impervious gloves are recommended when needed to avoid skin contact. Based on available test data, 4H or Silver Shield gloves are suggested.

**Eye Protection:** Chemical safety goggles recommended.

**Other Protective Equipment:** Impervious clothing as required to prevent skin contact and contamination of personal clothing. Suitable eye wash and washing facilities should be available in the work area.

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance and Odor:** Slightly reddish liquid with a refreshing odor.

**pH:** 6-7

**Boiling Point:** 258°F

**Vapor Pressure:** 12 mm Hg @ 20°C (aliphatic alcohol)

**Vapor Density (air =1):** Greater than 1

**Specific Gravity:** 0.87

**Melting Point:** Not applicable

**Water Solubility:** Negligible

**Evaporation Rate (ether=1):** Less than 1

**SECTION 10: STABILITY AND REACTIVITY**

**Stability:** Stable under normal conditions of storage or use.

**Incompatibility/Conditions to Avoid:** Avoid strong oxidizing agents, reducing agents, acids, bases, amines, alkanolamines, ammonia, chlorinated compounds. Avoid heat, sparks, flames and all other sources of ignition.

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# MSDS # 014258

KROIL  
6/7/05

**Hazardous Decomposition Products:** Combustion will produce oxides of carbon, organic compounds, smoke and fumes.

**Hazardous Polymerization:** Will not occur.

## SECTION 11: TOXICOLOGICAL INFORMATION

Toxicological testing has not been performed on this product as a mixture.

The calculated acute toxicity values, as determined by the DOT and other agency standard formula are: Oral LD50 = 2270; Dermal LD50 = 1500 mg/kg. Kroil is not classified as toxic under workplace or transportation criteria.

## SECTION 12: ECOLOGICAL INFORMATION

No data available.

## SECTION 13: DISPOSAL INFORMATION

Dispose in accordance with all local, state and federal regulations.

## SECTION 14: TRANSPORT INFORMATION

**DOT Shipping Name:** Exempted from Hazmat when packaged in non-bulk containers (<119 gal) and shipped ground

**DOT Hazard Class/Packing Group:** None

**UN Number:** None

**DOT Labels Required (49CFR172.101):** None

**Hazardous Substance (49CFR172.101):** None

**Reportable Quantity:** None

**DOT Marine Pollutants:** This product does not contain marine pollutants as defined in 49CFR 171.8.

**IATA Shipping Name:** Flammable liquid, n.o.s. (Aliphatic Alcohols, Petroleum Distillates)

**IATA Hazard Class/Packing Group:** 3, III

**UN Number:** UN1993

**IATA Hazard Labels Required:** Class 3

## SECTION 15: REGULATORY INFORMATION

### U.S. FEDERAL REGULATIONS:

**CERCLA 103 Reportable Quantity:** This product is not subject to CERCLA reporting requirements, however, oil spills are reportable to the National Response Center under the Clean Water Act and many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

MSDS # 014258

KROIL  
6/7/05

**SARA TITLE III:**

**Hazard Category for Section 311/312:** Acute Health, Chronic Health, Fire Hazard

**Section 313 Toxic Chemicals:** This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirements:

Aliphatic Alcohol	78-92-2	1-5%
Glycol Ether	111-76-2	1-5%
1,2,4-Trimethylbenzene	95-63-6	.5 - < 5%

**Section 302 Extremely Hazardous Substances (TPQ):** None

**EPA Toxic Substances Control Act (TSCA) Status:** All of the components of this product are listed on the TSCA inventory.

**SECTION 16: OTHER INFORMATION**

**HMIS Ratings:** Health - 1      Flammability - 2      Reactivity - 0  
**NFPA Ratings:** Health - 1      Flammability - 2      Reactivity - 0

=====  
=====  
The information contained herein has been developed based upon current available scientific data. New information may be developed from time to time which may render the conclusions of this report obsolete. Therefore, no warranty is extended as to the applicability of this information to the user's intended purpose or the consequences of its use or misuse.

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# MATERIAL SAFETY DATA SHEET

SAFEGARD 5022A

MSDS # 020641

## SECTION I

### Manufacturer

Sanchem Inc  
1600 S. Canal St.  
Chicago, IL 60616  
312-733-6100

### TSCA Status

Components listed.  
CAS Number: Mixture.

### Transportation Emergency Telephone Formula

CHEMTREC: (800) 424-9300

Mixture.

## SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

None in reportable quantities per OSHA 1910.1200. See Section VI and X.

## SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS (Typical data, not specifications)

Boiling Point  
212°F (100°C)

Freeze Point  
32°F (0°C)

Specific Gravity (H<sub>2</sub>O=1)  
1.0-1.2

Solubility in Water  
Soluble in alkaline  
water.

% Volatile by Weight  
57-66% water

Vapor Density (Air = 1)  
water: 0.63

Vapor Pressure  
Water: 17

pH  
5-8

Appearance and Odor  
Hazy or while milky liquid.  
Slight acrylate odor.

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# MATERIAL SAFETY DATA SHEET

SAFEGARD 5022A

MSDS # 020641

## SECTION I

### Manufacturer

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Chicago, IL 60616  
312-733-6100

### TSCA Status

Components listed.  
CAS Number: Mixture.

### Transportation Emergency Telephone Formula

CHEMTREC: (800) 424-9300 Mixture.

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None in reportable quantities per OSHA 1910.1200. See Section VI and X.

## SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS (Typical data, not specifications)

Boiling Point  
212°F (100°C)

Freeze Point  
32°F (0°C)

Specific Gravity (H<sub>2</sub>O=1)  
1.0-1.2

Solubility in Water  
Soluble in alkaline  
water.

% Volatile by Weight  
57-66% water

Vapor Density (Air = 1)  
water: 0.63

Vapor Pressure  
Water: 17

pH  
5-8

Appearance and Odor  
Hazy or while milky liquid.  
Slight acrylate odor.

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SECTION IV – FIRE AND EXPLOSION HAZARD DATA

**MSDS # 020641**

Flash Point  
Not applicable (NA),  
water solution.

Ignition Temperature  
NA

Flammable Limits in Air  
(% by volume) Lower: NA  
Upper: NA

Extinguishing Media

If water is evaporated, dry polymer could burn. Water spray, ABC dry chemical and protein type air foams are effective. Carbon dioxide may be ineffective on larger fires due to a lack of cooling capacity within may result in reignition.

Special Firefighting Procedure

Wear positive pressure self-contained breathing apparatus (SCBA). Personnel not having suitable respiratory protection must leave the area to prevent significant exposure to toxic combustion gases from any source. In enclosed or poorly ventilated areas, wear SCBA during cleanup immediately after a fire as well as during the attach phase of firefighting operations.

Unusual Fire and Explosion Hazards

None known.

SECTION V – REACTIVITY DATA

Stability  
Stable

Hazardous Polymerization  
Will not occur.

Hazardous Decomposition Products

CO, CO<sub>2</sub>, aromatic and aliphatic hydrocarbons from burning dry polymer.

Incompatibility (conditions/materials to avoid)

- Avoid contact with strong oxidizing agents such as hydrogen peroxide, permanganates, and perchlorates. Depending on the amount of specific materials involved, contact can result in intense heat, boiling flame development, explosion or toxic gas generation.
- Lowering product pH by acid addition may cause precipitation.

SECTION VI – HEALTH HAZARD DATA

No toxicity tests have been conducted on this product. Information presented is our best judgment based upon similar products and/or individual components. As with all products for which limited data baser available, caution must be exercised through the use of protective equipment and handling procedures to minimize exposure.

Threshold Limit Value  
None established for  
product by OSHA or ACGIH.

Carcinogenic Status  
Not listed by IARC,  
NTP or OSHA.

Routes of Exposure  
Eye/skin contact,  
ingestion.

Acute Health Effects

None known. Eye contact may cause irritation. Repeated or prolonged skin contact may cause irritation. Vapors may cause eye and respiratory irritation. **NOTICE:** Product may contain residual amounts of a processing chemical (trade secret) in amounts <1%, but, infrequently, ≤1.5%. No adverse health effects are expected.

Overexposure to the residual chemical by itself could cause symptoms such as eye and respiratory tract irritation, dizziness, anesthesia, headache, nausea, or vomiting.

<u>Chronic Health Effects</u>	<u>Signs/Symptoms of Exposure</u>	<u>Medical Conditions Aggravated by Exposure</u>
None known	Irritation	None known

Emergency and First Air Procedure

If irritation occurs or persists from any route of exposure, remove the affected individual from the area. See a physician.

EYE CONTACT: Flush eyes with plenty of clean water for at least five (5) minutes while holding eyelids open.

SKIN CONTACT: Wash the affected area with plenty of soap and water.

INGESTION: Dilute by drinking water or milk. Induce vomiting by sticking finger down throat or by giving Syrup of Ipecac. See a physician.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult give oxygen. Never give anything by mouth to an unconscious person. Call a physician.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be taken in case material is released or spilled

Contain spill. If spilled in an enclosed area, ventilate. Do not flush liquid into public sewer or water systems. Recover as much as possible for reuse. Absorb remainder with an inter material. Place into closed container and store in a safe location to await disposal. Wash the spill area with soap and water. Change contaminated clothing and laundry before reuse. Wear proper personal protective clothing and equipment.

CAUTION: Spilled liquid and dried film and slippery. Use care to avoid falls.

Waste Disposal Method

For waste disposal purposes, this product is not defined or designated as hazardous by current provisions of the Federal (EPA) Resources Conservation and Recovery Act (RCRA, 40CFR261). Liquid or dry material may be disposed of by incineration. Most states prohibit disposal of liquids in landfills. State and local regulations where the waste material is generated, treated and/or disposed must be examined to verify the appropriate waste classification.

Precautions to be taken in handling and storage

- Use under well ventilated conditions.
- Avoid skin and eye contact.
- Wash thoroughly after handling product. Always wash up before eating, smoking or using toilet facilities.
- Keep container closed when not in use and upright to prevent leakage.
- Store product where temperatures are between 50-100°F (10-38°C); ideally, 70°F (21°C).
- When neutralizing or adjusting pH, follow all safety precautions regarding proper use of the chemical involved.

- Storage tanks, pumps, piping and fittings should all be of stainless steel, glass lined carbon steel, glass fiber reinforced polyester, or epoxy or phenolic coated carbon steel. Avoid use of zinc. Copper, iron, aluminum or low carbon steel (these materials will cause either a breakdown of the polymer, discoloration of the resin or reduction of pH by reacting with ammonia present in some products).

SECTION VIII - CONTROL MEASURES

**MSDS # 020641**

Ventilation

Effective general and, if necessary, local exhaust ventilation must always be provided to draw fumes or vapors away from workers to prevent routine inhalation. Ventilation guidelines/techniques may be found in publications such as Industrial Ventilation, 20<sup>th</sup> Edition, American Conference of Governmental Industrial Hygienists, 6500 Glenway Avenue, Bldg. d-7, Cincinnati, OH 45211-4438.

Respiratory Protection

Not normally required. Wear an organic vapor respirator approved by NIOSH/MSHA whenever exposure to fumes or vapors cannot be avoided. Use respirator in accordance with manufacturer's use limitation and OSHA standard 1910-134 (29CFR).

Protective Equipment

- Wear eye protection (splash goggles where spilling or splashing may occur).
- Wear water resistant protective gloves.

SECTION IX - TRANSPORTATION

For domestic transportation purposes, this product is not known to be defined or designated as a hazardous material by the U.S. Department of Transportation under Title 49 of the Code of Federal Regulations, 1986 Edition.

- |                             |                |
|-----------------------------|----------------|
| - DOT Proper Shipping Name: | Not applicable |
| - DOT Hazard Class:         | Not applicable |
| - DOT Label:                | Not applicable |
| - UN/NA Hazard No.:         | Not applicable |
| - Reportable Quantity (RQ): | Not applicable |

SECTION X - HAZARD CLASSIFICATION

Federal

- SARA Title III (40CFR311/312) Hazard Category: Not known to be applicable.
- SARA Title III Section 313 Toxic Chemicals present at or above de minimus concentrations: None known.

State

While we do not specifically analyze these products, or the raw materials used in their manufacture, for substances on various state hazardous substances lists; to the best of our knowledge no such substances are present except those specifically listed below.

- California Proposition 65: "substances known to the State of California to cause cancer, birth defects or other reproductive harm": None known.
- Massachusetts Substance List: Ammonia\* (I).

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- New Jersey Workplace Hazardous Substance List: Ammonia \*
- Pennsylvania Right to Known Act: (1) Contains trade secret chemical typically before the reporting concentration. (2) Ammonia\* (I)

\*Ammonia (C.A.S. 7664-41-7) is present at approximately 0.4%

International

**MSDS # 020641**

- Canadian Controlled Products Regulation (WHMIS): Not known to be applicable.
- Canadian Ingredient Disclosure List (WHMIS): None known in reportable amounts.
- European Economic Community: Not known to be applicable.
- European Economic Community EINECS: Monomers listed.

NFPA 704\*

Health: 0  
 Flammability: 0  
 Reactivity: 0  
 Special: None

HMIS\*\*

Health: 1  
 Flammability: 0  
 Reactivity: 0  
 Personal Protection: B (Goggles, gloves)

Key: 0 = Insignificant; 1 = Slight; 2 = Moderate; 3 = High; 4 = Extreme.

\* National Fire Protection Association rating identified the severity of hazardous of material during a fire emergency (i.e., "on fire")

\*\* Hazardous Materials Identification Systems, National Paint and Coatings Association rating applies to product "as packaged" (i.e., ambient temp.).

USER'S RESPONSIBILITY

This bulletin cannot cover all possible situations which the user may experience during processing. Each aspect of your operation should be examined to determine if, or where, additional precautions may be necessary. All health and safety information contained in this bulletin should be provided to your employees or customers. It is your responsibility to use this information to develop appropriate work practice guidelines and employee instructional programs for your operation.

DISCLAIMER OF LIABILITY

As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this material. Information contained herein is believed to be true and accurate but all statements or suggestions are made with out warranty, expressed or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state and local laws and regulations remains the responsibility of the user.

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**DOW CORNING****DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 1 of 7

**DOW CORNING 200(R) FLUID, 20 CST.****1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY**Dow Corning Corporation  
South Saginaw Road  
Midland, Michigan 48686**24 Hour Emergency Telephone: (989) 496-5900**  
Customer Service: (989) 496-6000  
Product Disposal Information: (989) 496-6315  
CHEMTREC: (800) 424-9300

MSDS No.: 01013173

Revision Date: 2002/05/01

Generic Description: Silicone  
Physical Form: Liquid  
Color: Colorless  
Odor: Odorless

NFPA Profile: Health 0 Flammability 1 Instability/Reactivity 0

Note: NFPA = National Fire Protection Association

**2. OSHA HAZARDOUS COMPONENTS**

None present. This is not a hazardous material as defined in the OSHA Hazard Communication Standard.

**3. EFFECTS OF OVEREXPOSURE**Acute EffectsEye: Direct contact may cause temporary redness and discomfort.  
Skin: No significant irritation expected from a single short-term exposure.  
Inhalation: No significant effects expected from a single short-term exposure.  
Oral: Low ingestion hazard in normal use.Prolonged/Repeated Exposure EffectsSkin: No known applicable information.  
Inhalation: No known applicable information.  
Oral: No known applicable information.Signs and Symptoms of Overexposure

No known applicable information.

Medical Conditions Aggravated by Exposure

No known applicable information.

The above listed potential effects of overexposure are based on actual data, results of studies performed upon similar compositions, component data and/or expert review of the product. Please refer to Section 11 for the detailed toxicology information.

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**DOW CORNING**

**DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

**DOW CORNING 200(R) FLUID, 20 CST.**

**4. FIRST AID MEASURES**

Eye: Immediately flush with water.  
 Skin: No first aid should be needed.  
 Inhalation: No first aid should be needed.  
 Oral: No first aid should be needed.  
 Comments: Treat symptomatically.

**5. FIRE FIGHTING MEASURES**

Flash Point: > 214 °F / > 101.1 °C (Closed Cup)  
 Autoignition Temperature: Not determined.  
 Flammability Limits in Air: Not determined.  
 Extinguishing Media: On large fires use dry chemical, foam or water spray. On small fires use carbon dioxide (CO<sub>2</sub>), dry chemical or water spray. Water can be used to cool fire exposed containers.  
 Fire Fighting Measures: Self-contained breathing apparatus and protective clothing should be worn in fighting large fires involving chemicals. Determine the need to evacuate or isolate the area according to your local emergency plan. Use water spray to keep fire exposed containers cool.  
 Unusual Fire Hazards: None.

Hazardous Decomposition Products

Thermal breakdown of this product during fire or very high heat conditions may evolve the following hazardous decomposition products: Carbon oxides and traces of incompletely burned carbon compounds. Silicon dioxide. Formaldehyde.

**6. ACCIDENTAL RELEASE MEASURES**

DOW CORNING

## DOW CORNING CORPORATION

### Material Safety Data Sheet

Page: 3 of 7

#### DOW CORNING 200(R) FLUID, 20 CST.

**Containment/Clean up:** Determine whether to evacuate or isolate the area according to your local emergency plan. Observe all personal protection equipment recommendations described in Sections 5 and 8. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbant. Clean area as appropriate since some silicone materials, even in small quantities, may present a slip hazard. Final cleaning may require use of steam, solvents or detergents. Dispose of saturated absorbant or cleaning materials appropriately, since spontaneous heating may occur. Local, state and federal laws and regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which federal, state and local laws and regulations are applicable. Sections 13 and 15 of this MSDS provide information regarding certain federal and state requirements.

Note: See section 8 for Personal Protective Equipment for Spills. Call Dow Corning Corporation, (989) 496-5900, if additional information is required.

#### 7. HANDLING AND STORAGE

Use with adequate ventilation. Avoid eye contact.

Use reasonable care and store away from oxidizing materials.

#### 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

##### Component Exposure Limits

There are no components with workplace exposure limits.

##### Engineering Controls

Local Ventilation: None should be needed.  
General Ventilation: Recommended.

##### Personal Protective Equipment for Routine Handling

Eyes: Use proper protection - safety glasses as a minimum.  
Skin: Washing at mealtime and end of shift is adequate.  
Suitable Gloves: No special protection needed.  
Inhalation: No respiratory protection should be needed.  
Suitable Respirator: None should be needed.

##### Personal Protective Equipment for Spills

Eyes: Use proper protection - safety glasses as a minimum.  
Skin: Washing at mealtime and end of shift is adequate.

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**DOW CORNING****DOW CORNING CORPORATION  
Material Safety Data Sheet**

Page: 4 of 7

**DOW CORNING 200(R) FLUID, 20 CST.**

Inhalation/Suitable Respirator: No respiratory protection should be needed.

Precautionary Measures: Avoid eye contact. Use reasonable care.

Comments: When heated to temperatures above 150 degrees C in the presence of air, product can form formaldehyde vapors. Formaldehyde is a potential cancer hazard, a known skin and respiratory sensitizer, and an irritant to the eyes, nose, throat, skin, and digestive system. Safe handling conditions may be maintained by keeping vapor concentrations within the OSHA Permissible Exposure Limit for formaldehyde.

Note: These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Physical Form: Liquid  
 Color: Colorless  
 Odor: Odorless  
 Specific Gravity @ 25°C: 0.95  
 Viscosity: 20 cSt  
 Freezing/Melting Point: Not determined.  
 Boiling Point: > 35C/95F  
 Vapor Pressure @ 25°C: Not determined.  
 Vapor Density: Not determined.  
 Solubility in Water: Not determined.  
 pH: Not determined.  
 Volatile Content: Not determined.

Note: The above information is not intended for use in preparing product specifications. Contact Dow Corning before writing specifications.

**10. STABILITY AND REACTIVITY**

Chemical Stability: Stable.  
 Hazardous Polymerization: Hazardous polymerization will not occur.  
 Conditions to Avoid: None.  
 Materials to Avoid: Oxidizing material can cause a reaction.

**11. TOXICOLOGICAL INFORMATION****Special Hazard Information on Components**

No known applicable information.

**12. ECOLOGICAL INFORMATION****Environmental Fate and Distribution**

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**DOW CORNING**

**DOW CORNING CORPORATION  
Material Safety Data Sheet**

**DOW CORNING 200(R) FLUID, 20 CST.**

**Air:** This product is a high molecular weight liquid polymer which has a very low vapour pressure (<1 mm Hg). As a result it is unlikely to become an atmospheric contaminant unless generated as an aerosol.

**Water:** This product has a very low water solubility (< 100 ppb). As it has a specific gravity of < 1, if discharged to water, it will initially form a surface film. As the product is non volatile and has a high binding affinity for particulate matter, it will adsorb to particulates and sediment out.

**Soil:** If discharged to surface water, this product will bind to sediment. If discharged in effluent to a waste water treatment plant, the product is removed from the aqueous phase by binding to sewage sludge. If the sewage sludge is subsequently spread on soil, the silicone product is expected to degrade.

**Degradation:** This product, polydimethylsiloxane, degrades in soil abiotically to form smaller molecules. These in turn are either biodegraded in soil or volatilized into the air where they are broken down in the presence of sunlight. Under appropriate conditions, the ultimate degradation products are inorganic silica, carbon dioxide and water vapour. Due to the very low water solubility of this product, standard OECD protocols for ready and inherent biodegradability are not suitable for measuring the biodegradability of this product. The product is removed >80% during the sewage treatment process.

**Environmental Effects**

**Toxicity to Water Organisms:** Based on analogy to similar materials this product is expected to exhibit low toxicity to aquatic organisms.

**Toxicity to Soil Organisms:** Experiments show that when sewage sludge containing polydimethylsiloxane is added to soil, it has no effect on soil micro-organisms, earthworms or subsequent crops grown in the soil.

**Bioaccumulation:** This product is a liquid and is a high molecular weight polymer. Due to its physical size it is unable to pass through, or be absorbed by biological membranes. This has been confirmed by testing or analogy with similar products.

**Fate and Effects in Waste Water Treatment Plants**

This product or similar products has been shown to be non-toxic to sewage sludge bacteria.

Ecotoxicity Classification Criteria

Hazard Parameters (LC50 or EC50)	High	Medium	Low
Acute Aquatic Toxicity (mg/L)	<=1	>1 and <=100	>100
Acute Terrestrial Toxicity	<=100	>100 and <= 2000	>2000

This table is adapted from "Environmental Toxicology and Risk Assessment", ASTM STP 1179, p.34, 1993.

This table can be used to classify the ecotoxicity of this product when ecotoxicity data is listed above. Please read the other information presented in the section concerning the overall ecological safety of this material.

**13. DISPOSAL CONSIDERATIONS**

**RCRA Hazard Class (40 CFR 261)**

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**DOW CORNING****DOW CORNING CORPORATION  
Material Safety Data Sheet**

Page: 6 of 7

**DOW CORNING 200(R) FLUID, 20 CST.**

When a decision is made to discard this material, as received, is it classified as a hazardous waste? No

State or local laws may impose additional regulatory requirements regarding disposal.

Call Dow Corning Corporate Environmental Management, (989) 496-6315, if additional information is required.

**14. TRANSPORT INFORMATION****DOT Road Shipment Information (49 CFR 172.101)**

Not subject to DOT.

**Ocean Shipment (IMDG)**

Not subject to IMDG code.

**Air Shipment (IATA)**

Not subject to IATA regulations.

Call Dow Corning Transportation, (989) 496-8577, if additional information is required.

**15. REGULATORY INFORMATION**

Contents of this MSDS comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA Status: All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.

**EPA SARA Title III Chemical Listings****Section 302 Extremely Hazardous Substances:**

None.

**Section 304 CERCLA Hazardous Substances:**

None.

**Section 312 Hazard Class:**

Acute: No  
Chronic: No  
Fire: No  
Pressure: No  
Reactive: No

**Section 313 Toxic Chemicals:**

None present or none present in regulated quantities.

**Supplemental State Compliance Information**

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**DOW CORNING****DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 7 of 7

**DOW CORNING 200(R) FLUID, 20 CST.****California**

Warning: This product contains the following chemical(s) listed by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as being known to cause cancer, birth defects or other reproductive harm.

None known.

**Massachusetts**

No ingredient regulated by MA Right-to-Know Law present.

**New Jersey**

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
63148-62-9	> 60.0	Polydimethylsiloxane

**Pennsylvania**

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
63148-62-9	> 60.0	Polydimethylsiloxane

**16. OTHER INFORMATION**

Prepared by: Dow Corning Corporation

These data are offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

(R) indicates Registered Trademark

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# MSDS # 023671

QUICK 'n BRITE, INC.  
22313 70th Avenue West  
Mountlake Terrace, WA 98043  
Emergency Phone: 425-778-8285

N/A = NOT APPLICABLE  
NA = NOT AVAILABLE

MATERIAL SAFETY DATA SHEET  
PRODUCT NAME: QUICK 'n BRITE  
PASTE

Prepared By: K. Woods in accordance with OSHA and WHMIS requirements

Date: March 3, 2000

CHEMICAL FAMILY: Mixture

FORMULA: Proprietary Mixture of Sodium Cocoate, emulsifiers, water conditioners, and water

HAZARDOUS INGREDIENTS (CAS #):	%	EXPOSURE LIMITS, ppm:	ACGIH TLV	OSHA-PEL
NONE	N/A		N/A	N/A

This product contains no ingredients considered hazardous according to the criteria of 29 CFR 1910.1200 or listed on the Ingredient Disclosure List. This product contains no chemical regulated under SARA 313 as a reportable substance.

CARCINOGENIC INGREDIENTS. Contains no known or suspected carcinogens.

### PHYSICAL PROPERTIES:

Boiling Point: about 200 degrees F  
Solubility in Water: Appreciable  
Specific Gravity - Liquid (H<sub>2</sub>O = 1): 1.01-1.02  
Odor and Appearance: Pink paste; mild scent  
pH (as is): 8.0-9.5

% Volatiles: N/A (Non-volatile mixture)  
% Volatile Organic Content (VOC): 0  
Vapor Pressure: N/A  
Vapor Density (Air=1): N/A

### FIRE AND EXPLOSION DATA:

Flash Point: None  
Extinguishing Media: Water, CO<sub>2</sub>, foam, dry chemical  
Special Firefighting Procedures: None

Flammability Limits: N/A  
Unusual Hazards: None

### HEALTH EFFECTS:

Effects of overexposure: May cause minor temporary eye irritation. Ingestion may cause nausea or diarrhea.  
Chronic effects of overexposure: None known or expected.  
Medical conditions that may be aggravated by exposure: None known or expected.  
Primary routes of entry: Ingestion

### EMERGENCY AND FIRST AID PROCEDURES:

Eye Contact: Flush thoroughly with plenty of water for several minutes. If irritation persists, see a physician.  
Skin Contact: Flush thoroughly from skin with water. If irritation persists, see a physician.  
Ingestion: Drink plenty of water and call a physician immediately.  
Inhalation of dust: N/A

### REACTIVITY DATA:

Stability: Stable  
Incompatibility: None  
Conditions to Avoid: None

Hazardous Polymerization: Will not occur.  
Hazardous Decomposition Products: None

### SPILL OR LEAKAGE PROCEDURES:

Steps to be taken if material is released or spilled: Scoop up excess and place in a closed container. Scrub area well to reduce slipperiness.  
Waste disposal method: According to local, state, or federal ordinances. Not a hazardous or regulated waste.

### SPECIAL PROTECTION INFORMATION:

Ventilation: No special ventilation required.  
Respiration Protection: None required.  
Eye Protection: None required  
Protective Gloves: None required  
Other Protective Equipment: None required.

### SPECIAL PRECAUTIONS:

Precautions to be taken in handling and storage: Store in closed container in a dry place. Wash thoroughly after handling.  
KEEP OUT OF REACH OF CHILDREN.  
Other precautions: None

### HAZARD RATING:

Health:	0	0 = Minimal	3 = Serious
Fire:	0	1 = Slight	4 = Severe
Reactivity:	0	2 = Moderate	

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# CH2M HILL ENGINEERING CHANGE NOTICE

1a. ECN 725506 R 0

Page 1 of 6

DM  FM  TM

1b. Proj. ECN N/A - - R

2. Simple Modification <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		3. Design Inputs - For full ECNs, record information on the ECN-1 Form (not required for Simple Modifications)		4. Date 3/28/08	
5. Originator's Name, Organization, MSIN, & Phone No. GJ Gauck, CH2M Hill, S7-24, 373-1779		6. PrHA Number No. PrHA-00193 R - 0 <input type="checkbox"/> N/A	7. USQ Number No. TF - 08 - 0603 - D R - 0 <input type="checkbox"/> N/A	8. Related ECNs ECN-725507	
9. Title 241-SX-101 Replace Filter with Radial Filter Assembly		10. Bldg. / Facility No. 241SX/241-SX-101	11. Equipment / Component ID SX101-WST-FLT-101	12. Approval Designator E	
13. Engineering Documents/Drawings to be Changed (Incl. Sheet & Rev. Nos.) See Block 18		14. Safety Designation <input type="checkbox"/> SC <input type="checkbox"/> SS <input checked="" type="checkbox"/> GS <input type="checkbox"/> N/A		15. Expedited/Off-Shift ECN? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
16a. Work Package Number CLO-WO-08-0563	16b. Modification Work Completed <i>GJ Gauck</i> APR 17 2008 Responsible Engineer / Date	16c. Restored to Original Status (TM) N/A Responsible Engineer / Date	17. Fabrication Support ECN? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

18. Description of the Change (Use ECN Continuation pages as needed)  
Engineering Document/Drawings to be Changed (continued from Block 13)

H-2-73218, Sh 1, R3.

This ECN replaces the G-1 breather filter housing assembly with a radial breather filter assembly.

See page 3 for continuation of description of change

19. Justification of the Change (Use ECN Continuation pages as needed) Engineering Rework <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		20. ECN Category	
The old G-1 breather filter assembly installed on tank 241-SX-101 is being replaced with a new radial filter assembly as requested by Operations.		<input type="checkbox"/> Direct Revision <input checked="" type="checkbox"/> Supplemental <input type="checkbox"/> Void/Cancel  <u>ECN Type</u> <input type="checkbox"/> Supersedure <input type="checkbox"/> Revision	

21. Distribution			
Name	MSIN	Name	MSIN
DG Baide	S7-24	MA Fish	S7-24
RP Tucker	S7-83	AD Hjellum	S7-92
JS Conrad	S7-03	SD Doss	S7-03
SD Doss	S7-03		
TR Farris	S7-27		
GJ Gauck	S7-27		
KJ Hull	S7-27		

Release Stamp

DATE: APR 09 2008  
STA: 3  
RELEASE

# CH2M HILL ENGINEERING CHANGE NOTICE

1a. ECN 725506 R 0

Page 2 of *8/6* *4/19/08*

DM  FM  TM

1b. Proj. ECN N/A - R

**22. Revisions Planned (Include a brief description of the contents of each revision)**

None

Note: All revisions shall have the approvals of the affected organizations as identified in block 12 "Approval Designator," on page 1 of this ECN.

**23. Commercial Grade Item Dedication Numbers** (associated with this design change)  
N/A

**24. Engineering Data Transmittal Numbers** (associated with this design change, e.g., new drawings, new documents)  
N/A

**25. Other Non Engineering (not in HDCS) documents that need to be modified due to this change**

Type of Document	Document Number	Update Completed On	Responsible Engineer (print/sign and date)
Alarm Response Procedure	N/A	N/A	N/A
Operations Procedure	N/A	N/A	N/A
Maintenance Procedure	3-VB-157SX		
Type of Document	Document Number	Type of Document	Document Number
Env. Spec.	RPP-16922 (pg 53)	N/A	N/A
PM	WT-106317 (new yearly repl.)		
PM	WT-03722 (old BFAT)		
PM	WT-06754 (old repl)		

**26. Field Change Notice(s) Used?**

Yes  No

If Yes, Record Information on the ECN-2 Form, attach form(s), include a description of the interim resolution on ECN Page 1, block 18, and identify permanent changes.

NOTE: ECNs are required to record and approve all FCNs issued. If the FCNs have not changed the original design media then they are just incorporated into the design media via an ECN. If the FCN did change the original design media then the ECN will include the necessary engineering changes to the original design media.

**27. Design Verification Required?**

Yes  No

If Yes, as a minimum attach the one page checklist from TFC-ENG-DESIGN-P-17.

**28. Approvals**

Facility/Project Signatures	Date	A/E Signatures	Date
Resp. Engineer GA Gauck <i>[Signature]</i>	4-7-08	Originator/Design Agent	
Resp. Manager DG Baide <i>[Signature]</i>	4-9-08	Professional Engineer	
Quality Assurance		Project Engineer	
IS&H Engineer		Quality Assurance	
NS&L Engineer		Safety	
Environ. Engineer <i>[Signature]</i>	4-7-08	Designer	
Engineering Checker TR Farris <i>[Signature]</i>	4-7-08	Environ. Engineer	
Other SX Farm System Engineer M Fish <i>[Signature]</i>	4/7/08	Other	
Other		Other	
Other		DEPARTMENT OF ENERGY / OFFICE OF RIVER PROTECTION	
Other		Signature or a Control Number that tracks the Approval Signature	
Other		ADDITIONAL SIGNATURES	
Other			
Other			

**CH2M HILL ENGINEERING CHANGE NOTICE  
CONTINUATION SHEET**

1a. ECN 725506 R 0

Page 3 of 6

1b. Proj. ECN N/A - - R

Document/Drawing No. N/A

Sheet N/A

Revision N/A

**Description of Change** (Continued from page 1)

**PROBLEM:** The 241-SX-101 breather filter is installed in a "G1" housing. This filter recently failed aerosol testing. See PER-2008-0598. In response management determined that the filter and housing would be removed and replaced with a radial breather filter assembly.

**ANALYSIS:** The 241-SX-101 breather filter wye assembly is attached to the 10" tank riser (Riser 18) with a 4" to 10" expansion flange.

Also attached to the breather filter wye assembly is an abandoned SHMS vapor probe assembly. The abandoned vapor probe will not be affected by this ECN.

Per RPP-10906 "Passive Ventilation Breather Assembly Structural Analysis" the loads imposed on a riser from a 4" x 4" x 4" breather filter wye assembly with a G1 housing for the required seismic and wind loads are:  
Dead Load – 480 lbs. Dead load moment – 8450 lbs. Seismic Shear – 216 lbs. Seismic moment - 125 in\*lbs.  
Seismic Torsion – 3, 805 in\*lbs. The loads imposed by using the same wye assembly and replacing the butterfly valve with a like- for- like replacement will not change this portion of the analysis..

Since the radial breather filter assembly is smaller, lighter, shorter, and has less wind surface area than the breather filter assembly (approx. 62 lbs) compared with a G1 housing (180 lbs, Ref-10906) the loads imposed on by this structure on a riser will be significantly less than the loads determined in RPP-10960. Since a radial breather filter is bounded by the loads and joint connections in the previous analysis, the 241-SX-101 Riser 18 is adequate to support the loads imposed by the new radial breather filter assembly.

Additionally, the preferred ASME AG-1 compliant radial filter assemblies have been shown to be a good cost effective replacement for the older G-1 filter assemblies.

**SOLUTION:** The breather filter will be replaced with a radial breather filter. Additionally, the wafer style butterfly valve will be replaced with the lug body butterfly valve as shown in the design media H-2-90718 Assy 350.

H-2-73218, Rev. 3, Sht. 1: Change the Riser and Nozzle Schedule on the drawing to show radial breather filter installed on Riser 18 as shown on page 4 of this ECN.

**WORK INSTRUCTIONS:** See specific work package for work instructions.

**POST MAINTENANCE TESTING:** An AG-1 checklist will be completed after installation.

Note: An AutoCAD page may be used in place of this form (the header section items must be included on the AutoCAD page).

CH2M HILL ENGINEERING CHANGE NOTICE  
CONTINUATION SHEET

1a. ECN 725506 R 0

Page 4 of 56  
A 4-7-3

1b. Proj. ECN NA - - R

Document/Drawing No. H-2-73218

Sheet 1

Revision 3

WAS

2

1

NOZZLE AND RISER SCHEDULE

RISER/NOZZLE NO.	SIZE	IDENTIFICATION	REFERENCE AND COMMENTS
SX101-WST-RISER-001	4"	SPARE	RISER IS GREATER THAN 3'-0" BELOW GRADE LEAVE "AS IS"
SX101-WST-RISER-002	4"	THERMOCOUPLE	EXST TC CUT OFF AND RISER SEALED WITH BLIND FLANGE PER DET 1 H-2-73450
SX01A-WST-RISER-003	4"	TANK FILL	COVERED WITH CONCRETE (H-2-46248)
SX101-WST-RISER-004	4"	ATG	ENRAF 854 ATG LEVEL GAUGE PER H-2-817634
SX101-WST-RISER-005	12"	AIR SPARGE CUT OFF IN RISER	RISER IS GREATER THAN 3'-0" BELOW GRADE LEAVE "AS IS"
SX101-WST-RISER-006	12"	VAPOR MANIFOLD	LEAVE "AS IS", SEE NOTE 6 AND 10.
SX01A-WST-RISER-007	12"	SLURRY RISER	LEAVE "AS IS"
SX101-WST-RISER-008	12"	AIR INLET CIRCULATOR	INSTALL CAISSON AROUND RISER-008 PER DET 11 H-2-73451
SX01A-WST-RISER-009	12"	SALT WELL PUMP	LEAVE "AS IS", SEE NOTE 5 (SALTWELL CASE)
SX101-WST-RISER-010	3"	PROBE AND THERMOCOUPLE	REMOVE EQUIPMENT AND BLIND FLANGE PER DET 1 H-2-73450
SX101-WST-RISER-011	8"	SELF-CONCENTRATOR	LEAVE "AS IS", SEE GENERAL NOTE 2
SX101-WST-RISER-012	1/2"	SPARGER	PLUG AND GROUT PER DET 1
SX101-WST-RISER-013	42"	COVER PLATE	LEAVE "AS IS"
SX101-WST-RISER-014	4"	SLUDGE MON PORT	L.O.W. (PROJ B-436, H-2-93715)
SX101-WST-RISER-015	4"	SLUDGE MON PORT	TC TREE, H-2-90342 ASSY 5 (PROJ B-221)
SX101-WST-RISER-016	6"	TEMP MONITOR	PLUG AND GROUT CONDUIT PER DETAIL 1 REGASKET AND BLIND FLANGE RISER
SX101-WST-RISER-018	4"	STANDARD HYDROGEN MONITOR SYSTEM/AIRFILTER	H-2-85268 SH 1 H-2-90718 SH 1
SX101-WST-RISER-019	12"	SPARE	OBSV PORT (PROJ B-222, H-2-93726)
SX101-WST-RISER-020	1/2"	AIR PURGE	CUT OFF FLUSH WITH CONCRETE, PLUG AND GROUT PER DET 1
SX101-WST-RISER-021	1/2"	AIR PURGE	
SX101-WST-RISER-022	1/2"	AIR PURGE	
SX101-WST-RISER-023	1/2"	AIR PURGE	

F

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CH2M HILL ENGINEERING CHANGE NOTICE  
CONTINUATION SHEET

Page 5 of 86

1a. ECN 725506 R 0

1b. Proj. ECN NA - R

Document/Drawing No. H-2-73218

Sheet 1

Revision 3

IS

2 1

NOZZLE AND RISER SCHEDULE

RISER/NOZZLE NO.	SIZE	IDENTIFICATION	REFERENCE AND COMMENTS
SX101-WST-RISER-001	4"	SPARE	RISER IS GREATER THAN 3'-0" BELOW GRADE LEAVE "AS IS"
SX101-WST-RISER-002	4"	THERMOCOUPLE	EXST TC CUT OFF AND RISER SEALED WITH BLIND FLANGE PER DET 1 H-2-73450
SX01A-WST-RISER-003	4"	TANK FILL	COVERED WITH CONCRETE (H-2-46248)
SX101-WST-RISER-004	4"	ATG	ENRAF 854 ATG LEVEL GAUGE PER H-2-817634
SX101-WST-RISER-005	12"	AIR SPARGE CUT OFF IN RISER	RISER IS GREATER THAN 3'-0" BELOW GRADE LEAVE "AS IS"
SX101-WST-RISER-006	12"	VAPOR MANIFOLD	LEAVE "AS IS". SEE NOTE 6 AND 10
SX01A-WST-RISER-007	12"	SLURRY RISER	LEAVE "AS IS"
SX101-WST-RISER-008	12"	AIR INLET CIRCULATOR	INSTALL CAISSON AROUND RISER-008 PER DET 11 H-2-73451
SX01A-WST-RISER-009	12"	SALT WELL PUMP	LEAVE "AS IS". SEE NOTE 5 (SALTWELL CASE)
SX101-WST-RISER-010	3"	PROBE AND THERMOCOUPLE	REMOVE EQUIPMENT AND BLIND FLANGE PER DET 1 H-2-73450
SX101-WST-RISER-011	8"	SELF-CONCENTRATOR	LEAVE "AS IS". SEE GENERAL NOTE 2
SX101-WST-RISER-012	1/2"	SPARGER	PLUG AND GROUT PER DET 1
SX101-WST-RISER-013	42"	COVER PLATE	LEAVE "AS IS"
SX101-WST-RISER-014	4"	SLUDGE MON PORT	L.O.W. (PROJ B-436, H-2-93715)
SX101-WST-RISER-015	4"	SLUDGE MON PORT	TC TREE, H-2-90342 ASSY 5 (PROJ B-221)
SX101-WST-RISER-016	6"	TEMP MONITOR	PLUG AND GROUT CONDUIT PER DETAIL 1 REGASKET AND BLIND FLANGE RISER
SX101-WST-RISER-018	10"	STANDARD HYDROGEN MONITOR SYSTEM (BREATHE FILTER)	H-2-85268 SH 1 H-2-90718 (ASSY 350)
SX101-WST-RISER-019	12"	SPARE	OBSV PORT (PROJ B-222, H-2-93726)
SX101-WST-RISER-020	1/2"	AIR PURGE	CUT OFF FLUSH WITH CONCRETE. PLUG AND GROUT PER DET 1
SX101-WST-RISER-021	1/2"	AIR PURGE	
SX101-WST-RISER-022	1/2"	AIR PURGE	
SX101-WST-RISER-023	1/2"	AIR PURGE	

Note: An AutoCAD page may be used in place of this form (the header section items must be included on the AutoCAD page).

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**REVIEW COMMENT RECORD (RCR)**

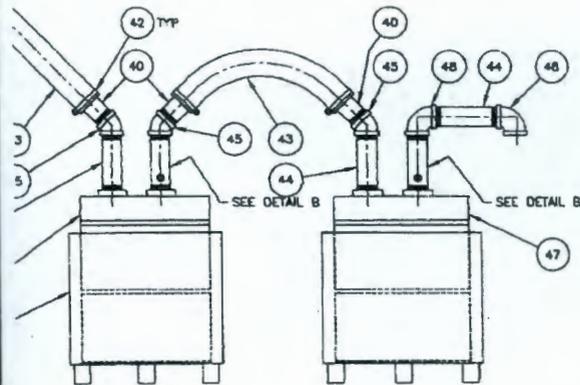
1. Date 04/07/2008	2. Review No. GJG-SX-101-1
3. Project No. NA	Page 1 of 1

5. Document Number(s)/Title(s) ECN-725506- R0, 241-SX-101 Replace Filter with Radial Filter Assembly.	6. Program/Project/Building Number 241-SX	7. Reviewer See Block 13a	8. Organization/Group RC Engineering/COSE	9. Location/Phone 2704-HV, D-111 373-1779
17. Comment Submittal Approval  NA Date	10. Agreement With Indicated Comment Disposition(s)  See Block 13a Reviewer/Point of Contact (print and sign) 4-7-2008 Date GJ Gauck Author/Originator (print and sign)	11. CLOSED  Sec Block 13a Reviewer/Point of Contact (print and sign) 4-7-08 Date GJ Gauck Author/Originator (print and sign)		
	Organization Manager (optional) (print and sign)			

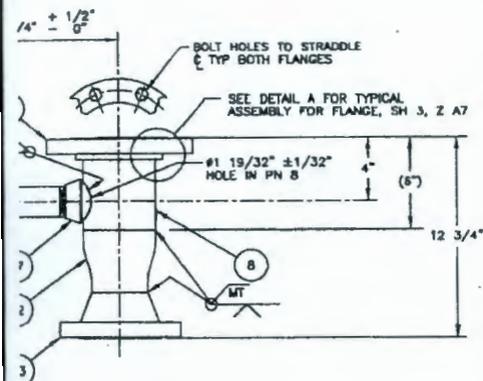
12. Item	13a. Comments			13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if NOT accepted)	16. Status
	Name:	Signature:	Date:					
1	S Doss	<i>[Signature]</i>	4-7-08	NA	No Comment	NA	NA	NA
	TR Farris	<i>[Signature]</i>	4-4-08					
	M Fish	<i>[Signature]</i>	4/7/08					
	DG Baide	<i>[Signature]</i>	4-9-08					

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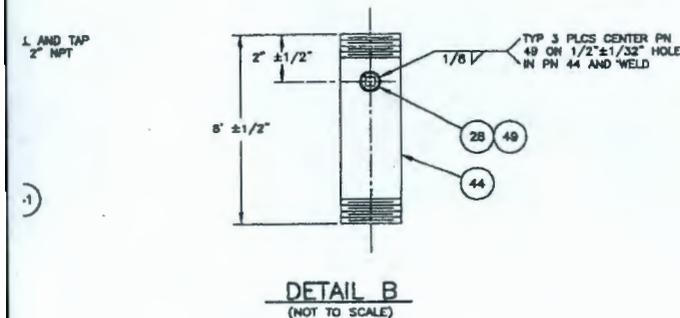




**39** INSTALLATION  
(NOT TO SCALE)



**ASSEMBLY**  
SCALE: 3\"/>

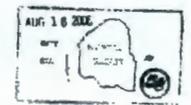


- ✓ 4\"/>
- 3. UNLESS OTHERWISE NOTED DIMENSIONAL TOLERANCES SHALL BE: FRACTIONS ±1/8\"/>
- 4. NOT USED
- 5. VALVE BUTTERFLY 4\"/>
- 6. PREPARE AND PAINT ALL EXPOSED CARBON STEEL SURFACES WITH PRIMER DIRECT TO METAL PAINT (MSDS 33820). TWO COATS OF AMERCOAT 220 (MSDS 25821) SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION. FINAL COAT TO BE GRAY.
- 7. IDENTIFY FILTER ASSY. DWG. #, SHT. #, AND ASSY # USING 1/2\"/>
- 8. WELD AND INSPECT PER ANSI B31.3—LATEST EDITION. VJ WELDS AT FINAL PASS. MT OR PT ALL DESIGNATED WELDS AT FINAL PASS AS SPECIFIED.
- 9. USE TEFLON TAPE ON ALL THREADED PIPE JOINTS.
- 10. PRIOR TO SETTING PN 46 AND PN 47 INTO PN 50 APPLY HEAT TRACE TO PN 46 AND PN 47 PER NOTE 14A. LEAVING ABOUT 4\"/>
- 11. PNEUMATIC PRESSURE TEST ASSEMBLIES 37, 38 & 39 AT 3.5±.5 PSIG PER HS-B5-DD076, TYPE I, FROM PN 41 TO THE EXIT ELBOW AFTER PN 47. USE A GAUGE WITH AN ACCURACY OF ±2% OVER THE RANGE OF THE GAUGE.
- 12. ROTATE FLEX HOSE ATTACHMENT PARTS AS NEEDED TO MEET FIELD CONDITIONS
- 13. FOR ASSEMBLIES 37, 38 & 39, INSTALL THE FLEX HOSE BETWEEN THE HEPA FILTER HOUSING AND PN 46 AT A MIN DROP OF .25\"/>
- 14. APPLY HEAT TRACE ASSEMBLIES 37, 38 & 39 FROM PN 8 TO THE EXIT OF THE ASSEMBLY USING THE FOLLOWING CRITERIA. (ALSO SEE NOTE 10)
  - A. HEAT TRACE PN 46 & PN 47 TO A POWER OF 200-300 WATTS
  - B. HEAT TRACE PN 5 TO POWER 60-150 WATTS
  - C. HEAT TRACE THE REMAINING PARTS TO A POWER OF 4-10 WATTS/FT.
  - D. USE A POWER CONNECTION KIT TO INITIATE POWER TO THE HEAT TRACE AT PN 8. USE SPLICE KIT AS NEEDED TO CONNECT THE HEAT TRACE AS A CONTINUOUS CIRCUIT USE A SIGNAL LIGHT TO END THE HEAT TRACE CIRCUIT AT THE EXIT OF THE ASSEMBLY. (SEE ECN 146432)
- 15. AFTER INSTALLATION OF THE HEAT TRACE, INSULATE ASSEMBLIES 37, 38 & 39 PER THE FOLLOWING INSTRUCTIONS. (ALSO SEE NOTE 10)
  - A. SECURE ALL INSULATION JOINTS WITH ARMSTRONG 520 ADHESIVE APPLY PER MANUFACTURER'S RECOMMENDATIONS.
  - B. USE ALUMINUM BANDS AS NEEDED TO HOLD THE INSULATION IN PLACE.
  - C. FINISH THE WEATHER EXPOSED SURFACE OF ALL INSULATION WITH ARMSTRONG STANDARD WHITE COLOR. APPLY PER MANUFACTURER'S RECOMMENDATIONS.
  - D. THE INSULATION SHALL NOT INTERFERE WITH THE REMOVAL OF ACCESS DOORS (HEPA FILTER HOUSING), OR THE OPERATION OF VALVES, OR DOP AND SAMPLE PORTS, OR THE MAINTENANCE OF ELECTRICAL EQUIPMENT.
  - E. INSULATE THE EXTERIOR OF PN 46 & PN 47 WITH ARMAFLEX II SHEET INSULATION, 2\"/>

- F. INSULATE THE EXTERIOR OF PN 5 WITH ARMAFLEX II SHEET INSULATION, 2\"/>
- G. INSULATE THE REMAINDER OF THE ASSEMBLIES FROM PN 8 (UNDER PN 8) TO THE EXIT OF THE ASSEMBLY WITH ARMAFLEX II SHEET OR PIPE INSULATION, 1\"/>
- 16. CONCRETE SHALL HAVE A MAXIMUM SLUMP OF 4 INCHES AND SHALL OBTAIN A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI. PART NOS. 77 AND 59 SHALL BE MADE WITH 2 LAYERS OF 6\"/>
- 17. INSTALLATION OF SPOOL PIECE ASSEMBLY (PART NO 54) :
  - A. MOUNT THE EXPANSION JOINT (PART NO 74) WITH YELLOW SHIPPING STRAPS STILL IN PLACE TO RISER 10A WITH A GASKET (PART NO 24) AND ALL ASSOCIATED FASTENING HARDWARE. HAND TIGHTEN THE BOLTS ONLY.
  - B. MOUNT THE SPOOL PIECE ASSEMBLY (PART NO 54) TO THE EXPANSION JOINT (PART NO 74) WITH A GASKET (PART NO 24) AND ALL ASSOCIATED FASTENING HARDWARE. HAND TIGHTEN THE BOLTS ONLY.
  - C. ATTACH THE BLIND FLANGE (PART NO 12) TO THE SPOOL PIECE ASSEMBLY (PART NO 54) WITH A GASKET (PART NO 24) AND ALL ASSOCIATED FASTENING HARDWARE.
  - D. LOCATE THE SUPPORT LEG ASSEMBLIES (PART NO 52) ACCORDINGLY. WHEN THE SUPPORT LEG ASSEMBLIES ARE LOCATED CORRECTLY, TIGHTEN ALL BOLTS AND MAKE ALL DESIGNATED WELDS ON THE SUPPORT LEG ASSEMBLIES.
  - E. REMOVE THE SHIPPING STRAPS FROM THE EXPANSION JOINT (PART NO 74). AFTER THE SHIPPING STRAPS ARE REMOVED, TORQUE ALL OF THE 12 INCH FLANGE BOLTS TO 120-130 FT-LBS.

- 19. INSTALL THE FLEX HOSE (PN 70) BETWEEN THE HEPA FILTER INSTALLATION (PN 1) AND THE SPOOL PIECE ASSEMBLY (PART NO 54) AT A MINIMUM DROP OF 1/4\"/>
- 20. FOR THE BY-110 FILTER HOUSING RELOCATION (INSTALLATION 51), USE ASTM A193 GR 8B, 3045ST AND ASTM A194 GR 8F, 303 SST FOR PNS. 22 AND 23 RESPECTIVELY INSTEAD OF THE CALLED OUT MATERIALS IN THE PARTS LIST. THE DESCRIPTIONS FOR PN 22 AND PN 23 WILL NOT CHANGE.
- 21. APPLY HEAT TRACE FROM THE INLET TO PN 32 OF THE VAPOR MIXING SYSTEM (H-14-100290) TO RISER 2 AT GRADE LEVEL AS SHOWN.
  - A. USE SELF-REGULATING HEATING CABLE RATED AT 5 WATTS/FOOT.
  - B. SPIRAL WRAP THE 2\"/>
- 22. AFTER INSTALLATION OF THE HEAT TRACE, INSULATE PER THE FOLLOWING INSTRUCTION.
  - A. INSULATE THE EXTERIOR OF THE G1 FILTER HOUSING, RISER 2 AND THE 4\"/>
- 23. NOT USED
- 24. A-105 ONLY: WRAP FILTER HOUSING WITH TWO HAZARDOUS-LOCATION HEAT BLANKETS (McMASTER-CARR ITEM NO. 3527K11) AND CONTROL WITH HAZARDOUS-LOCATION TEMPERATURE SWITCH (McMASTER-CARR ITEM NO. 5032KB5). TEMPERATURE SWITCH TO BE INSERTED IN PLACE OF THE TEST PORT PLUG (1/2\"/>
- 25. HEPA FILTERS FOR 0-1 STYLE HOUSINGS SHALL BE FLANDERS 0-007-W-43-05-NU-51-23-CC-FUS . SHALL BE PURCHASED IN ACCORDANCE WITH HNF-S-0552 (CURRENT REVISION). RADIAL STYLE HEPA FILTERS SHALL BE FLANDERS 0-007-1-12-RF-NU-00-E3-204059\* (\* IS A VARIA LETTER DESIGNATOR REPRESENTING THE CURRENT VENDOR DRAWING REVISION) AND SHALL BE PURCHASE IN ACCORDANCE WITH RPP-SPEC-28675 (CURRENT REVISION).
- 26. WELD AND INSPECT PER ANSI B31.3 (LATEST EDITION). VISUAL TEST ALL WELDS FINAL PASS.
- 27. SAE J429 FASTENERS IN THIS APPLICATION SHALL BE AN EQUIVALENT SUBSTITUTION FOR A307 FASTENER
- 28. ORIENT VALVE OPERATOR AS REQUIRED TO AVOID OPERATING INTERFERENCE WITH OTHER COMPONENTS.
- 29. WOOD AND ECOLOGY APPROVAL REQUIRED PRIOR TO FIELD INSTALLATION OF THIS FILTER.
- 30. FLANGE BOLTS FOR ASSY 227 ARE BASED ON USE OF A LUGGED BODY BUTTERFLY VALVE. IF A WAFER BODY BUTTERFLY VALVE IS USED THEN EIGHT EACH 5/8-11UNC X 4-3/4\"/>

FOR PARTS LIST SEE SHEETS 1 AND 7



**CH2M HILL ENGINEERING CHANGE NOTICE**

1a. ECN 725508 R 0

Page 1 of 6

DM  FM  TM

1b. Proj. ECN N/A - - R

2. Simple Modification <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		3. Design Inputs -- For full ECNs, record information on the ECN-1 Form (not required for Simple Modifications)		4. Date 3/28/08	
5. Originator's Name, Organization, MSIN, & Phone No. GJ Gauck, CH2M Hill, S7-24, 373-1779		6. PrHA Number No. PrHA-00193 R - 0 <input type="checkbox"/> N/A	7. USQ Number No. TF - 08 - 0803 - D R - 0 <input type="checkbox"/> N/A	8. Related ECNs ECN-725507	
9. Title 241-SX-101 Replace Filter with Radial Filter Assembly		10. Bldg. / Facility No. 241SX/241-SX-101	11. Equipment / Component ID SX101-WST-FLT-101	12. Approval Designator E	
13. Engineering Documents/Drawings to be Changed (Incl. Sheet & Rev. Nos.) See Block 18			14. Safety Designation <input type="checkbox"/> SC <input type="checkbox"/> SS <input checked="" type="checkbox"/> GS <input type="checkbox"/> N/A	15. Expedited/Off-Shift ECN? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
16a. Work Package Number CLO-WO-08-0563	16b. Modification Work Completed <i>Gy Gauck</i> 4/17/08 Responsible Engineer / Date	16c. Restored to Original Status (TM) APR 17 2008 N/A Responsible Engineer / Date	17. Fabrication Support ECN? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

18. Description of the Change (Use ECN Continuation pages as needed)  
Engineering Document/Drawings to be Changed (continued from Block 13)

H-2-73218, Sh 1, R3

This ECN replaces the G-1 breather filter housing assembly with a radial breather filter assembly.

See page 3 for continuation of description of change

19. Justification of the Change (Use ECN Continuation pages as needed) Engineering Rework <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		20. ECN Category	
The old G-1 breather filter assembly installed on tank 241-SX-101 is being replaced with a new radial filter assembly as requested by Operations.		<input type="checkbox"/> Direct Revision	
		<input checked="" type="checkbox"/> Supplemental	
		<input type="checkbox"/> Void/Cancel	
		ECN Type	
		<input type="checkbox"/> Supersedure	
		<input type="checkbox"/> Revision	

21. Distribution			
Name	MSIN	Name	MSIN
DG Baide	S7-24	MA Fish	S7-24
RP Tucker	S7-83	AD Hjellum	S7-92
JS Conrad	S7-03	SD Doss	S7-03
SD Doss	S7-03		
TR Farris	S7-27		
GJ Gauck	S7-27		
KJ Hull	S7-27		

Release Stamp

DATE: APR 09 2008  
STA: 3  
RELEASE  
ID: 18

APR 11 2008  
 STA. 3  
 18  
 Page 2 of 4  
 4/19/08

CH2M HILL ENGINEERING CHANGE NOTICE

1a. ECN 725506 R 0

1b. Proj. ECN N/A - - R

DM  FM  TM

22. Revisions Planned (Include a brief description of the contents of each revision)

None

Note: All revisions shall have the approvals of the affected organizations as identified in block 12 "Approval Designator," on page 1 of this ECN.

23. Commercial Grade Item Dedication Numbers (associated with this design change)

N/A

24. Engineering Data Transmittal Numbers (associated with this design change, e.g., new drawings, new documents)

N/A

25. Other Non Engineering (not in HDCS) documents that need to be modified due to this change

Type of Document	Document Number	Update Completed On	Responsible Engineer (print/sign and date)
Alarm Response Procedure	N/A	N/A	N/A
Operations Procedure	N/A	N/A	N/A
Maintenance Procedure	3-VB-157SX	will be attached separately	Gary Gauck / [Signature] 4.17.08
Type of Document	Document Number	Type of Document	Document Number
Env. Spec.	RPP-16922 (pg 53)	N/A	N/A
PM	WT-108317 (new yearly repl.)	4.17.08	Gary Gauck / [Signature] 4.17.08
PM	WT-03722 (old BFAT)	4.17.08	Gary Gauck / [Signature] 4.17.08
PM	WT-06754 (old repl)	4.17.08	Gary Gauck / [Signature] 4.17.08

26. Field Change Notice(s) Used?

Yes  No

If Yes, Record Information on the ECN-2 Form, attach form(s), include a description of the interim resolution on ECN Page 1, block 18, and identify permanent changes.

NOTE: ECNs are required to record and approve all FCNs issued. If the FCNs have not changed the original design media then they are just incorporated into the design media via an ECN. If the FCN did change the original design media then the ECN will include the necessary engineering changes to the original design media.

27. Design Verification Required?

Yes  No

If Yes, as a minimum attach the one page checklist from TFC-ENG-DESIGN-P-17.

28. Approvals

Facility/Project Signatures	Date	A/E Signatures	Date
Resp. Engineer GA Gauck [Signature]	4-7-08	Originator/Design Agent	
Resp. Manager DG Balda [Signature]	4-9-08	Professional Engineer	
Quality Assurance		Project Engineer	
IS&H Engineer		Quality Assurance	
NS&L Engineer		Safety	
Environ. Engineer SA [Signature]	4-7-08	Designer	
Engineering Checker TR Farris [Signature]	4-7-08	Environ. Engineer	
Other SX Farm System Engineer M Fish [Signature]	4/7/08	Other	
Other		Other	
Other		DEPARTMENT OF ENERGY / OFFICE OF RIVER PROTECTION	
Other		Signature or a Control Number that tracks the Approval Signature	
Other		ADDITIONAL SIGNATURES	
Other			
Other			

**CH2M HILL ENGINEERING CHANGE NOTICE  
CONTINUATION SHEET**

1a. ECN 725506 R 0

Page 3 of 6

1b. Proj. ECN N/A - - R

Document/Drawing No. N/A

Sheet N/A

Revision N/A

**Description of Change** (Continued from page 1)

**PROBLEM:** The 241-SX-101 breather filter is installed in a "G1" housing. This filter recently failed aerosol testing. See PER-2008-0598. In response management determined that the filter and housing would be removed and replaced with a radial breather filter assembly.

**ANALYSIS:** The 241-SX-101 breather filter wye assembly is attached to the 10" tank riser (Riser 18) with a 4" to 10" expansion flange.

Also attached to the breather filter wye assembly is an abandoned SHMS vapor probe assembly. The abandoned vapor probe will not be affected by this ECN.

Per RPP-10906 "Passive Ventilation Breather Assembly Structural Analysis" the loads imposed on a riser from a 4" x 4" x 4" breather filter wye assembly with a G1 housing for the required seismic and wind loads are:  
Dead Load – 480 lbs. Dead load moment – 8450 lbs. Seismic Shear – 216 lbs. Seismic moment - 125 in\*lbs.  
Seismic Torsion – 3, 805 in\*lbs. The loads imposed by using the same wye assembly and replacing the butterfly valve with a like- for- like replacement will not change this portion of the analysis..

Since the radial breather filter assembly is smaller, lighter, shorter, and has less wind surface area than the breather filter assembly (approx. 62 lbs) compared with a G1 housing (180 lbs, Ref-10906) the loads imposed on by this structure on a riser will be significantly less than the loads determined in RPP-10960. Since a radial breather filter is bounded by the loads and joint connections in the previous analysis, the 241-SX-101 Riser 18 is adequate to support the loads imposed by the new radial breather filter assembly.

Additionally, the preferred ASME AG-1 compliant radial filter assemblies have been shown to be a good cost effective replacement for the older G-1 filter assemblies.

**SOLUTION:** The breather filter will be replaced with a radial breather filter. Additionally, the wafer style butterfly valve will be replaced with the lug body butterfly valve as shown in the design media H-2-90718 Assy 350.

H-2-73218, Rev. 3, Sht. 1: Change the Riser and Nozzle Schedule on the drawing to show radial breather filter installed on Riser 18 as shown on page 4 of this ECN.

**WORK INSTRUCTIONS:** See specific work package for work instructions.

**POST MAINTENANCE TESTING:** An AG-1 checklist will be completed after installation.

CH2M HILL ENGINEERING CHANGE NOTICE  
CONTINUATION SHEET

1a. ECN 725506 R 0

Page 4 of 56  
4-9-03

1b. Proj. ECN NA - - R

Document/Drawing No. H-2-73218

Sheet 1

Revision 3

WAS

2

1

NOZZLE AND RISER SCHEDULE

RISER/NOZZLE NO.	SIZE	IDENTIFICATION	REFERENCE AND COMMENTS
SX101-WST-RISER-001	4"	SPARE	RISER IS GREATER THAN 3'-0" BELOW GRADE LEAVE "AS IS"
SX101-WST-RISER-002	4"	THERMOCOUPLE	EXST TC CUT OFF AND RISER SEALED WITH BLIND FLANGE PER DET 1 H-2-73450
SX01A-WST-RISER-003	4"	TANK FILL	COVERED WITH CONCRETE (H-2-46248)
SX101-WST-RISER-004	4"	ATG	ENRAF 854 ATG LEVEL GAUGE PER H-2-817634
SX101-WST-RISER-005	12"	AIR SPARGE CUT OFF IN RISER	RISER IS GREATER THAN 3'-0" BELOW GRADE LEAVE "AS IS"
SX101-WST-RISER-006	12"	VAPOR MANIFOLD	LEAVE "AS IS", SEE NOTE 6 AND 10
SX01A-WST-RISER-007	12"	SLURRY RISER	LEAVE "AS IS"
SX101-WST-RISER-008	12"	AIR INLET CIRCULATOR	INSTALL CAISSON AROUND RISER-008 PER DET 11 H-2-73451
SX01A-WST-RISER-009	12"	SALT WELL PUMP	LEAVE "AS IS", SEE NOTE 5 (SALTWELL CASE)
SX101-WST-RISER-010	3"	PROBE AND THERMOCOUPLE	REMOVE EQUIPMENT AND BLIND FLANGE PER DET 1 H-2-73450
SX101-WST-RISER-011	8"	SELF-CONCENTRATOR	LEAVE "AS IS", SEE GENERAL NOTE 2
SX101-WST-RISER-012	1/2"	SPARGER	PLUG AND GROUT PER DET 1
SX101-WST-RISER-013	42"	COVER PLATE	LEAVE "AS IS"
SX101-WST-RISER-014	4"	SLUDGE MON PORT	L.O.W. (PROJ B-436, H-2-93715)
SX101-WST-RISER-015	4"	SLUDGE MON PORT	TC TREE, H-2-90342 ASSY 5 (PROJ B-221)
SX101-WST-RISER-016	6"	TEMP MONITOR	PLUG AND GROUT CONDUIT PER DETAIL 1 REGASKET AND BLIND FLANGE RISER
SX101-WST-RISER-018	4"	STANDARD HYDROGEN MONITOR SYSTEM/AIRFILTER	H-2-85268 SH 1 H-2-90718 SH 1
SX101-WST-RISER-019	12"	SPARE	OBSV PORT (PROJ B-222, H-2-93726)
SX101-WST-RISER-020	1/2"	AIR PURGE	CUT OFF FLUSH WITH CONCRETE, PLUG AND GROUT PER DET 1
SX101-WST-RISER-021	1/2"	AIR PURGE	
SX101-WST-RISER-022	1/2"	AIR PURGE	
SX101-WST-RISER-023	1/2"	AIR PURGE	

4

**CH2M HILL ENGINEERING CHANGE NOTICE  
CONTINUATION SHEET**

1a. ECN 725506 R 0

Page 5 of 6  
2-7-08

1b. Proj. ECN NA - R

Document/Drawing No. H-2-73218

Sheet 1

Revision 3

IS

2

1

**NOZZLE AND RISER SCHEDULE**

RISER/NOZZLE NO.	SIZE	IDENTIFICATION	REFERENCE AND COMMENTS
SX101-WST-RISER-001	4"	SPARE	RISER IS GREATER THAN 3'-0" BELOW GRADE LEAVE "AS IS"
SX101-WST-RISER-002	4"	THERMOCOUPLE	EXST TC CUT OFF AND RISER SEALED WITH BLIND FLANGE PER DET 1 H-2-73450
SX01A-WST-RISER-003	4"	TANK FILL	COVERED WITH CONCRETE (H-2-46248)
SX101-WST-RISER-004	4"	ATG	ENRAF 854 ATG LEVEL GAUGE PER H-2-817634
SX101-WST-RISER-005	12"	AIR SPARGE CUT OFF IN RISER	RISER IS GREATER THAN 3'-0" BELOW GRADE LEAVE "AS IS"
SX101-WST-RISER-006	12"	VAPOR MANIFOLD	LEAVE "AS IS", SEE NOTE 6 AND 10
SX01A-WST-RISER-007	12"	SLURRY RISER	LEAVE "AS IS"
SX101-WST-RISER-008	12"	AIR INLET CIRCULATOR	INSTALL CAISSON AROUND RISER-008 PER DET 11 H-2-73451
SX01A-WST-RISER-009	12"	SALT WELL PUMP	LEAVE "AS IS", SEE NOTE 5 (SALTWELL CASE)
SX101-WST-RISER-010	3"	PROBE AND THERMOCOUPLE	REMOVE EQUIPMENT AND BLIND FLANGE PER DET 1 H-2-73450
SX101-WST-RISER-011	8"	SELF-CONCENTRATOR	LEAVE "AS IS", SEE GENERAL NOTE 2
SX101-WST-RISER-012	1/2"	SPARGER	PLUG AND GROUT PER DET 1
SX101-WST-RISER-013	42"	COVER PLATE	LEAVE "AS IS"
SX101-WST-RISER-014	4"	SLUDGE MON PORT	L.O.W. (PROJ B-436, H-2-93715)
SX101-WST-RISER-015	4"	SLUDGE MON PORT	TC TREE, H-2-90342 ASSY 5 (PROJ B-221)
SX101-WST-RISER-016	6"	TEMP MONITOR	PLUG AND GROUT CONDUIT PER DETAIL 1 REGASKET AND BLIND FLANGE RISER
SX101-WST-RISER-018	10"	STANDARD HYDROGEN MONITOR SYSTEM (BREATHER/FILTER)	H-2-85268 SH 1 H-2-90718 ASSY 350
SX101-WST-RISER-019	12"	SPARE	OBSV PORT (PROJ B-222, H-2-93726)
SX101-WST-RISER-020	1/2"	AIR PURGE	CUT OFF FLUSH WITH CONCRETE, PLUG AND GROUT PER DET 1
SX101-WST-RISER-021	1/2"	AIR PURGE	
SX101-WST-RISER-022	1/2"	AIR PURGE	
SX101-WST-RISER-023	1/2"	AIR PURGE	



**Work Order: CLO-WO-08-0580**

**Title: 241-SX-113 INSTALL NEW RADIAL HEPA FILTER**

**Date Created:** 3/28/2008 07:13:11

**Equipment:** SX113-WST-FLT-101

**SC/I:**

**WorkFlow:** WO Standard

**Planner:** Hjellum, Al

**Job Plan:** WT-106315

**WO Type:** 4 - MODIFICATION

**Assigned:** Gauck, Gregory J

**Farm/Facility:** 241SX

**State:** Ready For Work

**Phase Desig:**

**PM Id:** WT-106315

**RAD Risk:** Medium

**Flow Status:** OK

**Frequency:** 330

**CACN:** 501956

**Project Id:**

**Date Reqd:**

**Priority:** 2.2 Environmental Compliance

**Route Id:** CP-FLTRAD

**Description:**

41-SX-113 INSTALL NEW RADIAL HEPA FILTER  
N# O-007-1-12-RF-NU-00-E3-Z04059\*  
LETTER VARIABLE

COMMENTS:

REQUIREMENTS DOC AND SECT:

\*\*\*\*\*

REPLACE RADIAL HEPA FILTER PER PROCEDURE 5-VT-710.

\*\*\*\*\*

*Note: 04-24-08 Scanned/Champs = 44pgs. (Record - FOMS as of 05-25-08) DT-Clark )*

**Work Order: CLO-WO-08-0580**

**Title: 241-SX-113 INSTALL NEW RADIAL HEPA FILTER**

Step 1 Of 1 Step Id: 001

State: Ready For Work

Safety Class:

Sched Start:

Sched Comp:

Related Step/Link:

**Step Instructions:**

PERFORM FILTER INSTALLATION PER PROCEDURE 5-VT-710 ALL DATA RECORDED IN PROCEDURE.

Assets Seq	Asset Class	Asset Id	Asset Name	SC/I	Expiration Date
	Equipment	SX113-WST-FLT-101	FILTER, BREATHER, RADIAL, 241-SX	<input type="checkbox"/>	

Trades	Crew	Trade Id:	Trade Description:	Workers	Act Hrs.	Delay Code
		T110	Other Technicians	1	0	
		T050	Health Physics Technicians	1	0	
		C060	Millwrights	1	0	
		T060	Industrial Health/Safety Tech	1	0	
		R050	Nuclear Waste Process Operator	1	0	

**Attachments:** There are 4 document(s) attached to this work order

Description	Path/Name
Header Attachment ENVI-WAC-246-247	__871955__894642__954938__964699__964736.NVI-WAC-246-247
Procedure - 5-VT-710	__894645__954941__964701__964737.rocedure - 5-VT-710
RWP - CO-001 Latest Rev	__894646__954942__964702__964738.WP - CO-001 Latest Rev
http://idmsweb/idmsprod/livelink.exe?func=ll&objId=85970 http://idmsweb/idmsprod/livelink.exe?func=ll&objId=8597042&objAction=Ope	

**Electronic Approvals:**

Date	State	Response	Profile	Name	Role
3/28/2008 07:13:19	In Planning	Approved	ret_&_bo_pm_planner	Hjellum, Al	
4/1/2008 08:26:50	In Approval	Approved	ret_&_bo_rad_con	Holcomb, Stephen	bo_rad_con
4/9/2008 13:13:04	Ready For Work	Approved	ret_&_bo_pm_planner	Hjellum, Al	

**FWC**

FWS Completed By: KA B... FWC Date: 4-16-08 Update Job Plan (Y/N): N

Completed Satisfactorily(yes,no): y Asset Condition: \_\_\_\_\_

Comments: None

2

**Waste Planning Checklist**

Will waste be generated?	No	CHEMICAL/PAINT PRODUCTS
Will waste be generated in a radiological buffer area or contamination area?		
Will EQ be removed? (TF-cover blocks, 222S-Process EQ)		
Will waste contact process waste, tank waste, or tank waste contaminated material?		
Will work involve soil removal?		
Will there be any aerosol can(s) disposed of?		
Will asbestos waste be disposed of?		
Will HEPA filters be disposed of?		
Will chemical products or paint be used or disposed of?		
0. The following waste minimization techniques will be used?		

**1. GENERAL DESCRIPTION OF WASTE**

**IO WASTE IN THIS WORK PACKAGE.**

This is a new filter install in a new Radial Filter housing.  
 Old housing was removed in another work package (CLO-WO-08-0564).

1a. Estimate Waste Generated Quantity:

Per:  Job Length

**WASTE MANAGEMENT CONTROLS**

**Comments**

2. Is Waste Regulated as a Dangerous Waste?

12a. Disposition Instructions:

13. Facility Operations has been notified to take samples? (N/A if not required)		
14. Is a container already available for each disposition listed in the instructions?		
15. Does the quantity of the waste exceed capacity of available containers?		
16. Identify satellite accumulation area or accumulation area container(s) locations:		

Prepared By:

Date: 00/00/0000

Complete:

4/1/2008 8:54 AM

WORKING COPY

## Data Sheet 1 - QC Inspection Data

Radial HEPA Filter Change out QC Data Sheet*		
Filter component number where HEPA Filter will be Installed (i.e., B201-WST-FLT-101)	SX113-WST-FLT-101	
Work Package Number	CLO-WO-08-0580	
Date of Inspection	4.9.08	
Radial HEPA Filter (Record Information From Manufacturer's Label)		
Filter Manufacturer	Flanders	
Model Number (identify letter designation of filter to indicate which drawing revision filter is fabricated to.)	O-007-1-12-RF-NU-00-E3-Z04059 C	
Serial Number	SE 4.9.08 <del>000 34291</del> 1463462	
HEPA Filter Flow Rating	40	(CFM)
HEPA Filter Resistance	.81	(in. w.g.)
Manufacturer's Penetration Test Date	2-4-08	
Verify Filter Aerosol Penetration Has Been Tested by the Manufacturer and is No Greater than 0.03% at 100% of Rated Flow	SAT	UNSAT**
	X	
Seal (thread) Condition (No significant damage or cross threading, etc.)	SAT	UNSAT**
	X	
Comment:		

\* Additional copies of this data sheet shall be made for each individual filter installed by this procedure.

\*\* Any UNSAT conditions found should be described on Comment Page, and the System Engineer should be notified.

QC Inspector:

Jon Elliott  
Signature

Jon Elliott  
Print Name

4-9-08  
Date

Type	Document No.	Rev/Mod	Release Date	Page
CONTINUOUS	5-VT-710	B-0	03/31/2008	17 of 22

4

## Data Sheet 2 - Daily Survey Data

Daily Survey Data Sheet*				
Condition	Number	Date	Time	Initials
Pre-Job contamination and radiation survey number:	N/A			
Post-Job contamination and radiation survey number:	COF 7342	4/16/08	1000	JG
Comments: Survey completed by A. L. Johnson. By JG 4/17/08.				

\* Additional copies of this data sheet shall be made as needed by this procedure.

Data Sheet 3 - Filter Installation Data

Radial HEPA Filter Change-out Data Sheet*		
Work Package Number	110-40-09-580	
Date of Installation	4-16-08	
Flammable Gas Concentration		IHT Initials and date
Record Filter EIN/Component Number (e.g., xxxxx-VTP-FLT-001)	52-113-VTP-FLT-001	
<b>Inspect for:</b>	<b>SAT</b>	<b>UNSAT**</b>
No Damage to New HEPA Filter	X	
No Damage to Filter Weather Covers	X	
No Damage to Filter Threads	X	
No Damage to Bird Screen	X	
Bird Screen properly Installed (including alignment with weather cover)	X	
No Missing Fasteners	X	
No Missing Labels on Filter Assembly or Weather Covers	X	
Filter Isolation valve operates properly	X	
No Water In Filter	X	
No Visible Paint, Corrosion, or Other Foreign Objects In Filter Assembly	X	
New Filter Installed Properly with No Discrepancies	X	
Comment:		

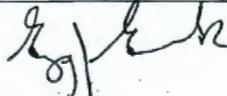
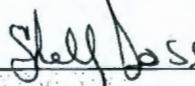
\* Additional copies of this data sheet shall be made for each individual filter installed by this procedure.  
 \*\* Any UNSAT conditions found should be described on Comment Page, a PER should be generated by the FWS for all UNSAT conditions, a work request should be generated by the FWS for all UNSAT conditions to correct the problem, and the System Engineer should be notified.

Craftsman:  / Marc Regimbal / 4-16-08  
 Signature Print Name Date

Craftsman: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 Signature Print Name Date

6

Data Sheet 4 - FWS/Engineering/Environmental Review

PER Numbers Generated (if Applicable):		
N/A		
Work Request Numbers Generated (if Applicable):		
N/A		
FWS:		
	RA Barnd	4/16/08
Signature	Print Name	Date
Forward package to System Engineer for review and signature.		
System Engineer:		
	Gregory J. Gauck	4/17/08.
Signature	Print Name	Date
Forward package to Environmental for review and signature.		
Environmental:		
	Shelly Doss	4-21-08
Signature	Print Name	Date

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### Comment Page

(This page may be reproduced as necessary)

Record below any comments encountered during performance of the procedure, and a description of any degraded conditions found and resulting actions taken. Also explain any UNSAT conditions described in Data Sheet 1 or Data Sheet 3

Date: 4/17/08

Shelly Doss from Environmental organization was notified of radial filter assembly installation on SX-113 on 4/16/08

Gregory Gauch  
Gregory Gauch.

WDOH notified on 4-16-08 that a radial was installed on SX-113, which replaced an open face breathe filter. Status 4-21-08

8

CH2M BILL OF MATERIAL

ORIGINAL

B.O.M. Suppl. 9

End Use: SX-113 RADIAL HEPA FILTER		Wk. Pkg. No.: CLO-WO-08-0580		MB: MB-06-00009		CACN/COA: 501955/FA60			
Date: 03/28/2008		Requestor: Hjellum, Al		Delivery Location: 2704HV - Material Coordinator		Premium Freight <input type="checkbox"/>			
Priority: 2.1		CGI:		Hjellum, Al (372-2540)		03/28/2008			
Date Required: 04/03/2008		Special Instructions/Emergency Justification:		Requestor		Date			
<input type="checkbox"/> Mandatory <input checked="" type="checkbox"/> Desired		As defined in TFC-BMS-CP_CPR-C-06, the Engineering and Quality Assurance approvals for this Bill of Material are located in Master BOM MB-06-00009 and are not required to be obtained for each BOM created under the aforementioned Master BOM.		Gauck, Gregory J (373-1779)		10/30/2006			
Suggested Vendor:				Engineer		Date		Manager	
QA Clauses: N/A				Not Required per DRA		Date		Date	
				RadCon		Date		Date	
				Not Required per DRA		Date		Date	
				Industrial Health		Date		Date	
				Not Required per DRA		Date		Date	
				Safety & Health		Date		Date	
				Not Required per DRA		Date		Date	
				Cost Account Manager		Date		Date	
		Shults, Duane L (373-4244)		03/28/2008		Duncan, Vella (373-3852)			
		Material Coordinator		Date		03/28/2008			

Item	Quantity	Estimated Cost	Safety Class	HAZMAT	MSDS	NRTL	Approval Desig.	Quality Level	QC Approval	Date/Qty Ordered	Order No.	Catalog No.
1	1	213.91	GS				N/A	2	NE 4-9-08	03/28/2008, 1.00	10001568	0000632916
	Unit: EACH	Delivery Date	Storage Level			B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)				Date/Qty Staged	Storage Bldg/Area	Storage Location
Material Description:			Additional Description:			Purchasing Description:			Comments:			
HEPA-TYPE FILTER, FILTER, HEPA, 40 CFM RADIAL, 1 1/2 IN. MNPT			FILTER, HEPA, RADIAL, 40 CFM NUCLEAR GRADE, PURCHASE PER RPP-SPEC-28675, CURRENT REV									
Part Number			Equipment Type			Manufacturer			Drawing/ECN/Spec Number			
O-007-1-12-RF-NU-00-E3-Z04059C			FILTERS			FLANDERS FILTERS			RPP-SPEC-28675			

1463462

RELEASED COMPLETE

Line # Released: 1 Released To: KA Board  
 Signature: [Signature] 4/15/08



ORD NO MEDIA LOT  
280091 1649/0/13uc

MFG NO 85609

F0622996  
0-007-1-12-RF-NU-00-E3-Z04059C



1463462

10

Work Order: CLO-WO-08-0579 ✓

Title: 241-SX-101 INSTALL NEW RADIAL HEPA FILTER

AND

CLO-WO-08-0580 ✓

241-SX-113 INSTALL NEW RADIAL FILTER

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WORK WITH

CLO-WO-08-0563 AND 0564



<b>RADIOLOGICAL WORK PERMIT</b>			Contractor: <b>CH2M HILL Hanford Group, Inc.</b>	RWP Number CO-469
General: [ ]	Start Date 04/09/2008	End Date 10/08/2008	Technical Document Number(s): CLO-WO-08-0563/ CLO-WO-08-0564	AMW Number AW-1411
Job Specific: [X]	Location: 200W/241 -SX/SX-101&113			
Brief Job Description and Type of Area: Replace Breather Filters with Radial Filters (RA,CA, HCA, ARA)				

Radiation Emitted	Estimated Dose Rates	Estimated Contamination Levels	Job Dose Estimate	Risk Value
[X] Alpha	General Area: 0.5 mrem/hr	Beta/Gamma: 100,000 dpm/100cm <sup>2</sup>	< 200 person-mrem	MEDIUM
[X] Beta	Maximum Contact: 3 mrem/hr	Alpha: < 20 dpm/100 cm <sup>2</sup>		
[X] Gamma	Radiological Worker [ ] I Training Req. [X] II	Internal Dosimetry Requirements		
[ ] Neutrons		[ ] 3 minute WBC	[X] 10 minute WBC	[SI 5] Urinalysis/Isotopes

DOSIMETRY		PERSONAL PROTECTIVE EQUIPMENT			SURVEY REQUIREMENTS	
X	HSD-TLD	X	Coveralls		Shoe Covers	SI 8 Grab Air Sampling Required
✓	HCND-TLD		Waterproof Suit	X	Canvas Boots	SI 8 Lapel Air Sampling Required
X	Pocket Dosimeter		Goretex Suit	X	Rubber Overshoes	SI 7 Auto. Survey Device
	Electronic Dosimeter		Cap		Rubber Boots	SI 7 Self Survey (if qualified)
SI 5	Finger Rings	SI 6	Hood		Face Shield	HPT Exit Survey Required
	Time Keeping	SI 6	Surgeon's Gloves	SI 5	Full Face Respirator	
X	Entry Control System	SI 6	Leather Gloves		P/PR	<b>HPT COVERAGE</b>
	Brick	SI 6	Canvas & Surgeon's Gloves		Supplied Air Respirator	SI 4 Continuous
	-Day ACES Auth.		Waterproof Gloves		SCBA	SI 4 Intermittent
		SI 6	Arm Sleeves		Undressing Assistance	
			Leaded Gloves			

**SPECIAL INSTRUCTIONS**

**1. VOID LIMITS**

- **RA:** Whole Body dose rate  $\geq 100$  mrem/hr @ 30 cm.
- **CA:** General area removable contamination levels  $\geq 100,000$  dpm/100 cm<sup>2</sup> beta-gamma or  $\geq 210$  dpm/100 cm<sup>2</sup> alpha.
- **HCA:** General area removable contamination  $\geq 400,000$  dpm/100cm<sup>2</sup> Beta-Gamma or  $\geq 200$  dpm/100cm<sup>2</sup> Alpha.

**2. SAFE CONDITION LEVELS**  
*IF a Safe Condition Level is met, stop normal work activities, place the work area in a stable condition, perform the actions stated within the associated Safe Condition Level AND notify the RadCon First Line Manager and Shift Operations Manager that a Safe Condition Level was reached or exceeded.*

- **RA:** Whole body dose rate  $\geq 80$  mrem/hr, establish/post HRA boundary and secure work activities.
- **CA:** General area removable contamination levels  $\geq 80,000$  dpm/100cm<sup>2</sup> beta-gamma or  $\geq 140$  dpm/100cm<sup>2</sup> alpha; establish/post HCA boundary and secure work activities.
- **HCA:** General area removable contamination  $\geq 200,000$  dpm/100cm<sup>2</sup> Beta-Gamma or  $\geq 150$  dpm/100cm<sup>2</sup> Alpha., decontaminate to less than these levels

**3. ACTION LEVELS**

- **CA:** General area removable contamination levels  $\geq 50,000$  dpm/100cm<sup>2</sup> beta-gamma or  $\geq 70$  dpm/100cm<sup>2</sup> alpha, decontaminate or apply fixative to reduce contamination to below these levels prior to continuing work activities.
- **HCA:** General area removable contamination  $\geq 50,000$  dpm/100cm<sup>2</sup> beta-gamma or  $\geq 70$  dpm/100cm<sup>2</sup> alpha, decontaminate to below these levels.

**4. HPT COVERAGE**

- Continuous HPT coverage is required when removing/replacing filter components
- Intermittent HPT coverage is required during set-up and clean-up

**5. DOSIMETRY/ACES**

- Personnel performing hands on work with contaminated components shall ACE in with the appropriate GW or WW Role and the COBIO Role.

**6. PERSONAL PROTECTIVE EQUIPMENT**

- **HCA:** Arm sleeves and an additional pair of gloves required for reaching inside HCA.
- **CA:** Single set of PPE with surgeons gloves and canvas, leather or cannery gloves required for entry.
- A hood will be required when:
  - a worker's head has a potential to contact contaminated surfaces.
  - contamination may drop from above due to overhead work.
  - When wearing a respirator

**7. SURVEY**

- Beta-Gamma and Alpha surveys required during the course of all intrusive work:
  - Alpha surveys of personnel and equipment required if alpha contamination was detected during the course of performing work.
  - Alpha survey required if Beta-Gamma contamination is detected.
- Auto Survey Device (ASD) requirements:
  - If ASD does not have alpha survey capabilities for areas requiring dual personnel surveys, perform a whole body Alpha survey prior to entering ASD.
  - If ASD is inoperable or unavailable, perform whole body survey(s). Perform a follow-up survey in an operable ASD.

**8. AIR SAMPLING**

- Work place grab air sampling required when removing/replacing filter components
- Lapel air sampling required when personnel are wearing respiratory protection for radiological purposes

**9. SPECIAL PREJOB BRIEFING**

- None required

**10. OTHER**

- N/A

RWP Prepared By: S.B. Holcomb		Phone: 373-1263		HPT Phone: 373-3353, 373-0303	
Line Mgt. Print:	Sign:	Phone:	Date:		
Sup. initial:	RC Dir. Print:	Sign:	Phone:	Date:	
Acknowledged by:	AJRG Chair (High Risk) Print:	Sign:	Date:	Other:	Print: Sign: Date:
RWP Field Change Approvals:	Line Mgt. Print:	Sign:	Date:	RC Mgt. Print:	Sign: Date:

<b>RADIOLOGICAL WORK PERMIT</b>			Contractor: <b>CH2M HILL Hanford Group, Inc.</b>		RWP Number CO-106, Rev.002
General: [ ]	Start Date	End Date	Technical Document Number(s): 3-VBP-153; -155; -156; -157; -158; -159; -656; -657; 5-VT-076; -710; 3-VB-491, -735 associated data sheets and work control documents, and CLO-WO-08-0206.		AMW Number AW-1373 Rev.001
Specific: [X]	1/22/2008	1/21/2009			
Job Location: All Tank Farm Facilities		Brief Job Description and Type of Area: Air Flow, dP, and aerosol testing of HEPA and/or HEGA filters and passive breather filter removal/replacement to include radial filters. Melt ice plugs in test ports if needed. (HCA/CA/RA/RBA) <b>THIS RWP DOES NOT PERMIT CHANGING OF ACTIVE VENTILATION HEPA and/or HEGA FILTERS.</b>			
Radiation Emitted		Estimated Dose Rates		Estimated Contamination Levels	
[X] Alpha	General Area: < 5 mrem/hr		Beta/Gamma: < 10,000dpm/100 cm <sup>2</sup>		Job Dose Estimate
[X] Beta	Maximum Contact: < 100 mrem/hr		Alpha: < 20 dpm/100 cm <sup>2</sup>		< 200 person-mrem per individual task
[X] Gamma	Radiological Worker [ ] I		Internal Dosimetry Requirements		
[ ] Neutrons	Training Req. [X] II		[ ] 3 minute WBC [X] 10 minute WBC [SI 5] Urinalysis/Isotopes [SI 5] Chest Count		
<b>DOSIMETRY</b>		<b>PERSONAL PROTECTIVE EQUIPMENT</b>			<b>SURVEY REQUIREMENTS</b>
X	HSD-TLD	SI 6	Coveralls	Shoe Covers	SI 8
	HCND-TLD		Waterproof Suit	Canvas Boots	SI 8
	Pocket Dosimeter		Goretex Suit	Rubber Overshoes	SI 7
	Electronic Dosimeter		Cap	Rubber Boots	SI 7
	Finger Rings	SI 6	Hood	Face Shield	SI 7
	Time Keeping	SI 6	Surgeon's Gloves	Full Face Respirator	
X	Entry Control System	SI 6	Leather Gloves	PAPR	
X	Brick	SI 6	Canvas & Surgeon's Gloves	Supplied Air Respirator	SI 4
X	1-Day ACES Auth.	SI 6	Waterproof Gloves	SCBA	SI 4
		SI 6	Arm Sleeves	Undressing Assistance	
<b>SPECIAL INSTRUCTIONS</b>					
<b>1. VOID LIMITS</b> <ul style="list-style-type: none"> <li>RA: Whole body dose rate &gt; 100 mrem/hour at 30 cm.</li> <li>HCA: General area removable contamination ≥800,000 dpm/100cm<sup>2</sup> beta-gamma or ≥420 dpm/100 cm<sup>2</sup> alpha.</li> </ul> <b>2. SAFE CONDITION LEVELS</b> <i>IF a Safe Condition Level met, stop normal work activities, place the work area in a stable condition, perform the action(s) stated within the associated Safe Condition Level AND notify the RadCon First Line Manager and Shift Operations Manager that a Safe Condition Level was reached or exceeded.</i> <ul style="list-style-type: none"> <li>CA: General area removable contamination ≥30,000 dpm/100 cm<sup>2</sup> beta-gamma or ≥140 dpm/100 cm<sup>2</sup> alpha during filter change-out process; replace filter cover and survey general area outside filter, and suspend work activities.</li> <li>RA: Whole body dose rates &gt; 50 mrem/hr, secure work activities at that location and notify RadCon SME of increased dose rates.</li> </ul> <b>3. ACTION LEVELS</b> <ul style="list-style-type: none"> <li>Catch Containment CA: Distributed removable contamination ≥ 10,000 dpm/100 cm<sup>2</sup> beta-gamma or ≥20 dpm/100 cm<sup>2</sup> alpha; decontaminate to below these levels prior to resuming work.</li> <li>Pre-job dose rate on filter housing prior to opening ≥1 mr/hr (closed window) above background do not open filter housing.</li> <li>If port seal containment is breached, survey area of port breach, if removable contamination is ≥1,000 dpm/100 cm<sup>2</sup> beta-gamma or ≥20 dpm/100 cm<sup>2</sup> alpha, re-seal port, decontaminate to below these levels and notify RadCon FLM prior to resuming work.</li> <li>CA: Removable contamination ≥50,000 dpm/100 cm<sup>2</sup> beta-gamma or ≥70 dpm/100 cm<sup>2</sup> alpha during aerosol testing, establish HCA controls around access port prior to continuing work activities.</li> </ul> <b>4. HPT COVERAGE</b> <ul style="list-style-type: none"> <li>Continuous coverage is required when accessing DOP Ports or opening filter housing.</li> <li>Intermittent coverage for all other work activities.</li> </ul> <b>5. DOSIMETRY/ACES</b> <ul style="list-style-type: none"> <li>Personnel performing hands on work with contaminated components shall ACE in with the appropriate GW or WW Role and the COBIO Role</li> </ul>			<ul style="list-style-type: none"> <li>Personnel wearing SCBA shall ACE in with the SCBA roll.</li> </ul> <b>6. PERSONAL PROTECTIVE EQUIPMENT</b> <ul style="list-style-type: none"> <li>ARA: SCBA required when using heat gun to melt ice plugs.</li> <li>HCA: Additional Arm Sleeves and Surgeons Gloves required for reaching into a HCA.</li> <li>RBA: Arm Sleeves and Surgeons Gloves required for reaching into a CA.</li> <li>CA: Single set of PPE and a second set of gloves (e.g. canvas, surgeons, leather, cannors, etc.) required for whole body entry.</li> <li>CA: A hood will be worn when: <ul style="list-style-type: none"> <li>a worker's head has a potential to contact contaminated surfaces,</li> <li>when contamination may drop from above due to overhead work</li> </ul> </li> </ul> <b>7. SURVEY</b> <ul style="list-style-type: none"> <li>The following areas require both Beta-Gamma and Alpha surveys: <ul style="list-style-type: none"> <li>244-TX/242-T, 242-S Evaporator, 241-EW-151, 241-TX-155, 244-AR, ER-311, 241-ER-151, 241-TX-113 &amp; -118</li> </ul> </li> <li>For partial body (arms and hands) entries into a CA from an RBA, or an HCA from a CA, perform a survey of hands, arms chest &amp; face each time hands and arms are removed from CA/HCA.</li> </ul> <b>8. AIR SAMPLING</b> <ul style="list-style-type: none"> <li>Grab air sampling is required during filter exchange w hen filter housings are open and when melting ice plugs with a heat gun. Sampler shall be located as close as possible to the work area.</li> <li>AKI Air Sampling required during aerosol testing and for downposting ARA.</li> </ul> <b>9. SPECIAL PREJOB BRIEFING</b> <ul style="list-style-type: none"> <li>N/A</li> </ul> <b>10. OTHER</b> <ul style="list-style-type: none"> <li>N/A</li> </ul>		
RWP Prepared By: Keith Gray		Phone: 373-4286		HPT Phone: 438-9294 / 373-3352	
Line Mgt.	Print: <i>[Signature]</i>	Date: 1/22/08		Phone: 438-9091	Date: 1-22-08
Supervisor:	RC Dir.	Print: <i>[Signature]</i>	Date: 1/22/08	Phone: 373-4286	Date: 1/22/08
Known by:	AJRG Chair (High Risk)	Print: <i>[Signature]</i>	Date: 1/22/08	Other: <i>[Signature]</i>	Print: <i>[Signature]</i>
RWP Field Change Approvals:	Line Mgt.	Print: <i>[Signature]</i>	Date: 1/22/08	RC Mgt.	Print: <i>[Signature]</i>

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Job/Task No.:

### WORKSITE HAZARD ANALYSIS

Date:

Replace SX HEPA Filters

04-16-08

Hazards	Possible Controls	Applicable PPE
<input type="checkbox"/> Electrical	<input type="checkbox"/> Lock out/Tag out <input type="checkbox"/> Barricade <input type="checkbox"/> Electrical Energized Work Permit <input type="checkbox"/> PPE Category (-1 to 4) specify _____ <input type="checkbox"/> AED Location Known/Available	<input type="checkbox"/> Hard Hat <input checked="" type="checkbox"/> Eye/Face Protection <input checked="" type="checkbox"/> Safety Glasses and side shields <input type="checkbox"/> Face Shield <input type="checkbox"/> Face Shield ARC <input type="checkbox"/> Chemical Goggles <input type="checkbox"/> Welding Hood <input type="checkbox"/> Other: _____
<input type="checkbox"/> Crane or other Lifting Equipment Lifting and rigging objects	<input type="checkbox"/> Special/Critical Lift Permit <input type="checkbox"/> Signalman assigned <input type="checkbox"/> Lifting equip inspected <input type="checkbox"/> Area around crane barricaded <input type="checkbox"/> Spotter	<input type="checkbox"/> Hearing Protection <input type="checkbox"/> Ear Muffs <input type="checkbox"/> Specify type: _____ <input type="checkbox"/> Foam/Ear Plugs
<input type="checkbox"/> Vehicular Traffic and/or Heavy Equipment	<input type="checkbox"/> Traffic Barricades <input type="checkbox"/> Cones <input type="checkbox"/> Signs <input type="checkbox"/> Flagman <input type="checkbox"/> Lane closure <input type="checkbox"/> Communication with equipment operator <input type="checkbox"/> Surface condition	<input checked="" type="checkbox"/> Gloves <input checked="" type="checkbox"/> Silver Shield <input type="checkbox"/> Canvas <input type="checkbox"/> Latex <input type="checkbox"/> Nitrile <input type="checkbox"/> PVC <input type="checkbox"/> Neoprene <input type="checkbox"/> Chemical Resistant Gloves <input type="checkbox"/> Specify: _____ See IS-6
<input type="checkbox"/> Overhead Utilities	<input type="checkbox"/> De-energization req. <input type="checkbox"/> Insulation blankets req. <input type="checkbox"/> Wire watcher req. <input type="checkbox"/> Req. clearance distance <input type="checkbox"/> Safe work zone marked	<input type="checkbox"/> Insulated Gloves <input type="checkbox"/> Vibration Dampening <input checked="" type="checkbox"/> Leather Gloves <input type="checkbox"/> Rubber Gloves <input type="checkbox"/> Voltage Rated Gloves NFPA-70 <input type="checkbox"/> Other: See CEHA & Table 1
<input type="checkbox"/> Falls (Scaffolding, Ariel lifts, Ladders, Roof work)	<input type="checkbox"/> Inspect general ladder condition before use <input type="checkbox"/> Current Ladder inspections <input type="checkbox"/> Ladder tied off <input type="checkbox"/> Proper angle/placement of ladders <input type="checkbox"/> Proper ladder size <input type="checkbox"/> 100% Tie Off of tools from lifts/scaffolds <input type="checkbox"/> Scaffold User Inspection before use <input type="checkbox"/> Competent Person Inspection of Scaffold <input type="checkbox"/> Fall Protection Plan <input type="checkbox"/> Roof Assessment	<input type="checkbox"/> Foot Protection <input checked="" type="checkbox"/> Protective footwear w/ankle support <input type="checkbox"/> Substantial footwear <input type="checkbox"/> Rubber Boots <input type="checkbox"/> Rubber Boots cover <input type="checkbox"/> Dielectric Footwear <input type="checkbox"/> Chemical Resistant Footwear <input type="checkbox"/> Other: _____
<input type="checkbox"/> Moving/Falling objects from height	<input type="checkbox"/> Tether small objects <input type="checkbox"/> Use rope, canvas bag <input type="checkbox"/> Barricade around potential fall area <input type="checkbox"/> Barricade tape <input type="checkbox"/> Hard hats <input type="checkbox"/> Tie off tools/materials <input type="checkbox"/> Warning signs <input type="checkbox"/> Cover over opening <input type="checkbox"/> Rigid railing required	
<input type="checkbox"/> Excavations	<input type="checkbox"/> Excavation/Shoring Permit <input type="checkbox"/> Inspect prior to entering <input type="checkbox"/> Competent Person Inspection <input type="checkbox"/> Proper sloping/shoring <input type="checkbox"/> Access/egress provided <input type="checkbox"/> Scans <input type="checkbox"/> Barricades	
<input type="checkbox"/> Underground Utilities (Line Locating)	<input type="checkbox"/> Reviewed ground scans <input type="checkbox"/> Received excavation permit <input type="checkbox"/> Maintain clearance distance <input type="checkbox"/> Safe work zone marked <input type="checkbox"/> Insulated hand tools	
<input type="checkbox"/> Fire Hazard, weld, burn, grind, solder	<input type="checkbox"/> Fire Extinguishers <input type="checkbox"/> Fire Watch <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Adjacent area protected <input type="checkbox"/> Unnecessary flammable material removed <input type="checkbox"/> Hot Work Permit	
<input type="checkbox"/> Noise > 85 dBA	<input type="checkbox"/> Hearing protection <input type="checkbox"/> Noise monitoring (IH)	
<input type="checkbox"/> High Energy Air/Steam/Fluid > 500 PSI or > 200 degrees	<input type="checkbox"/> Depressurize <input type="checkbox"/> PPE <input type="checkbox"/> Whip Check Tie-downs <input type="checkbox"/> Cool down systems <input type="checkbox"/> Lock Out/Tag Out	
<input type="checkbox"/> Stored Energy	<input type="checkbox"/> Lock Out/Tag Out <input type="checkbox"/> Remove energy <input type="checkbox"/> PPE	
<input type="checkbox"/> Rotating/Moving Equipment or Pinch points	<input type="checkbox"/> Lock Out/Tag Out <input type="checkbox"/> Machine guards in place <input type="checkbox"/> Block parts against motion <input type="checkbox"/> PPE <input type="checkbox"/> Hand/Body position <input type="checkbox"/> Remove Loose clothing	

Job/Task No.:

Replace SX HEPA Filters

## WORKSITE HAZARD ANALYSIS (continued)

Date:

047608

Hazards (continued)	Possible Controls (continued)	Applicable PPE (continued)
<input type="checkbox"/> Working With Chemicals (Examples: Lead, Beryllium, Asbestos, Acids, Bases, Paints, Glues, Solvents)	<input type="checkbox"/> Obtain MSDS and review controls <input type="checkbox"/> Have proper containers & labels <input type="checkbox"/> PPE <input type="checkbox"/> Fume Hoods, Glove boxes, etc. <input type="checkbox"/> Safety Showers identified <input type="checkbox"/> Eye wash station <input type="checkbox"/> Asbestos Work Permit <input type="checkbox"/> IH Monitoring Plan # _____ <input type="checkbox"/> Ventilation/Engineering Control	<input type="checkbox"/> Respiratory Protection <input type="checkbox"/> APR <input type="checkbox"/> PAPR <input type="checkbox"/> Airline <input type="checkbox"/> SCBA <input type="checkbox"/> Carri-Air <input type="checkbox"/> Specify Cartridges: _____
<input type="checkbox"/> Laboratory Hazards <input type="checkbox"/> Chemical Splashes <input type="checkbox"/> Chemical Compatibility <input type="checkbox"/> Reactive <input type="checkbox"/> Time Sensitive	<input type="checkbox"/> PPE <input type="checkbox"/> Chemical Segregation <input type="checkbox"/> Volume limitations <input type="checkbox"/> Special Labeling or postings <input type="checkbox"/> Fume Hoods	<input checked="" type="checkbox"/> Special Clothing <input type="checkbox"/> Tyvek <input type="checkbox"/> NFPA-70 Rated <input type="checkbox"/> Normex III <input type="checkbox"/> Rain Suit <input type="checkbox"/> Safety Vest <input type="checkbox"/> Silver Shield Apron, etc. <input checked="" type="checkbox"/> Other: <u>See Table 1</u>
<input type="checkbox"/> Pressurized Gas Cylinders	<input type="checkbox"/> Caps on while moving <input type="checkbox"/> Secured while moving or stored <input type="checkbox"/> Suitable lifting moving device	
<input type="checkbox"/> Potential Contact with Tank Waste	<input type="checkbox"/> Silver shield PPE (Gloves, hood, apron) <input type="checkbox"/> Respiratory protection	
<input type="checkbox"/> Confined Space	<input type="checkbox"/> Confined Space permit	
<input type="checkbox"/> Wall/Ceiling Penetration	<input type="checkbox"/> Scanned area where penetration will take place <input type="checkbox"/> Perform Walk Around	
<input checked="" type="checkbox"/> Radiological <input checked="" type="checkbox"/> Radiological Material <input checked="" type="checkbox"/> Radiological exposure <input checked="" type="checkbox"/> Radiological contamination <input type="checkbox"/> Loose or airborne contamination <input type="checkbox"/> Fixed contamination disturbed <input type="checkbox"/> Radiological generating device <input checked="" type="checkbox"/> Radiological system breached	<input checked="" type="checkbox"/> Radiological Work Permit # <u>CO-106 OR 469</u> <input type="checkbox"/> Radiological Screening process <input checked="" type="checkbox"/> ALARA Management Worksheet <input type="checkbox"/> Minimize <b>Time</b> in area (use of mockups, automated systems, etc.) <input type="checkbox"/> Maximize <b>Distance</b> to source of radiation (extension tools, remote operated equip., etc.) <input type="checkbox"/> Use of <b>Shielding</b> <input type="checkbox"/> Reduce item generating concern (contamination or radiation source) <input type="checkbox"/> Respiratory Protection <input type="checkbox"/> Contain source of contamination concern <input type="checkbox"/> Apply approved fixative	
<input type="checkbox"/> Flammable Gases	<input type="checkbox"/> Bonding <input type="checkbox"/> Intrinsically safe tools/equipment	
<input type="checkbox"/> Temperature Extremes <input type="checkbox"/> Heat Stress <input type="checkbox"/> Cold Stress	<input type="checkbox"/> Use Heat Stress Mitigation Checklist <input type="checkbox"/> Warming Hut <input type="checkbox"/> Frequency of Breaks	
<input checked="" type="checkbox"/> Tank Farm Vapors	<input checked="" type="checkbox"/> IH Monitoring and Sampling Plan # <u>See Other</u> <input checked="" type="checkbox"/> Temp. VCZ	
<input type="checkbox"/> Lack of Adequate Lighting	<input type="checkbox"/> Change work to daytime <input type="checkbox"/> Temporary lighting (Light stand or flashlight, etc.)	

Other:

VCZs can be downposted per Tank Farm Chemical Exposure Hazard Analysis 0108-302. SX-101 & 113 are on Table 1 list of tanks "not requiring silvershield PPE". IH Monitoring Plan is 7X100-JWJ-06-018.

**TANK FARM CHEMICAL EXPOSURE HAZARD ANALYSIS**  
**S-Complex - 5-VT-076 Breather Filter /5-VT-710 Radial Filter Replacement,**  
**January 23, 2008**

0108-302

**Summary:**

The vapor control zones in S-Complex can be temporarily down posted for work activity associated with 5-VT-076 Breather Filter / 5-VT-710 Radial Filter Replacement based upon the following hazard assessment as per TFC-ESHQ-S\_IH-CD-35 REV C-2, Managing Vapor Control Zones.

**Work Activity/Task:**

1. The work activities are detailed in 5-VT-076 Breather Filter Replacement.
2. The work activities are detailed in 5-VT-710 Radial Filter Replacement.
3. The work activities do not require waste-disturbing activities.

**Comparable Activities:**

1. Personal air sampling at S-Complex farms vapor sources showed no exposure measurements approaching 10% of the S-Complex Chemicals of Potential Concern. 7X100-JWJ-07-006. Results of Personal Air Sampling Conducted in S-Complex Tank Farms from November 2004-October 2006.
2. Review of air sampling and monitoring data up to 01/20/08 in S-Complex farms showed no exposure measurements approaching 10% of the S-Complex Chemicals of Potential Concern.

**Hazard Identification:**

1. The hazardous gases and vapors potentially generated in the S-Complex Tank Farms waste tanks were identified in RPP-22491, Industrial Hygiene Chemical Vapor Technical Basis.
2. The hazardous gases and vapors potentially generated in the S-Complex Tank Farms waste tanks during non-waste disturbing activities were identified during S-Complex Chemicals of Potential Concern Characterization air sampling.
3. The COPC Chemicals identified in S-Complex Tank Farms were ammonia, nitrous oxide, and nitrosamines.

**Data Review:**

1. Personal air sampling results for representative work activities conducted in S Complex tank farms from 11/04 – 10/06 showed no COPC exceeded 10% of the Tank Farm Occupational Exposure Limits. 7X100-JWJ-07-006. Results of Personal Air Sampling Conducted in S-Complex Tank Farms from November 2004-October 2006.
2. S-Complex COPC air sampling showed that no COPC exceeded 50% of the Tank Farm occupational exposure limit in the work areas, 5 ft from any recognized vapor source.

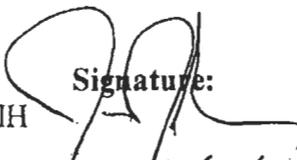
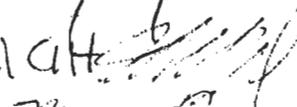
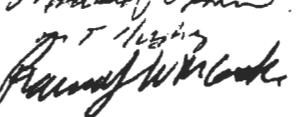
**TANK FARM CHEMICAL EXPOSURE HAZARD ANALYSIS**  
**S-Complex - 5-VT-076 Breather Filter /5-VT-710 Radial Filter Replacement,**  
**January 23, 2008**

0108-302

3. Review of air sampling and monitoring data up to 01/20/07 in S-Complex showed no exposure measurements approaching 10% of the S-Complex Chemicals of Potential Concern.
4. Comparison of the TWINS headspace data between C-103 and S-Complex tanks showed that no COPC's in S-Complex tanks differed by a factor of 4.

**Vapor Hazard Controls:**

1. The IHT will conduct air sampling and monitoring as per as per 7X100-JWJ-06-018, Monitoring and Sampling Plan for S, SX and SY-Farm Work Activities.
2. If IHT monitoring detects ammonia concentrations exceeding the Tank Farm Chemical Action Limit of 15 ppm in the work area during the operation, the work will be paused and the workers placed in a safe configuration and the issue is resolved before the work proceeds. If area ammonia levels remain above the chemical action limits for 15 minutes, a vapor control zone will be reestablished around the filters.

Title:	Name:	Signature:	Date:	Phone:
Industrial Hygienist:	J.W. Jabara, CIH		1/24/08	373-1385
IH Reviewer:	M.L. Zobel CIH		1-24-2008	376-0162
IH Manager:	M. T. Hughey		1-24-08	373-2874
Operations Manager:	R.W. Cook		1/24/08	372-1450

# MATERIAL SAFETY DATA SHEET: SIMPLE GREEN®

also for : SIMPLE GREEN® SCRUBBING PAD

## I. PRODUCT & COMPANY INFORMATION

Version No. 10012  
Issue Date: January 2008

PRODUCT NAME: SIMPLE GREEN® ALL-PURPOSE CLEANER  
SIMPLE GREEN® CONCENTRATED CLEANER / DEGREASER / DEODORIZER  
SIMPLE GREEN® SCRUBBING PAD

Page 1 of 4

COMPANY NAME: SUNSHINE MAKERS, INC.  
15922 Pacific Coast Highway  
Huntington Harbour, CA 92649 USA  
Telephone: 800-228-0709 • 562-795-6000  
Fax: 562-592-3034  
Website: www.simplegreen.com

MSDS # 012261

For 24-hour emergency, call Chem-Tel, Inc.: 800-255-3924

USE OF PRODUCT: An all purpose cleaner and degreaser used diluted in water for direct, spray, and dip tank procedures. (Scrubbing pad is used with water for manual scrubbing applications.)

## II. INGREDIENT INFORMATION

The only ingredient of Simple Green® with established exposure limits is undiluted 2-butoxyethanol (<6%) (Butyl Cellosolve; CAS No. 111-76-2); the ACGIH TLV-TWA is 20 ppm (97 mg/m<sup>3</sup>).

Based upon chemical analysis, Simple Green® contains no known EPA priority pollutants, heavy metals, or chemicals listed under RCRA, CERCLA, or CWA. Analysis by TCLP (Toxicity Characteristic Leaching Procedure) according to RCRA revealed no toxic organic or inorganic constituents.

All components of Simple Green® are listed on the TSCA Chemical Substance Inventory.

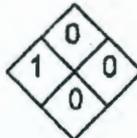
## III. HAZARDS IDENTIFICATION

UN Number: Not required  
Dangerous Goods Class: Nonhazardous

NJ TRADE SECRET REGISTRATION NUMBERS	
80100235-5000p	80100235-5005p
80100235-5001p	80100235-5006p
80100235-5002p	80100235-5007p
80100235-5003p	80100235-5008p
80100235-5004p	80100235-5009p

### Hazard Rating (NFPA/HMIS)

Health = 1\*      Reactivity = 0  
Fire = 0          Special = 0



### Rating Scale

0 = minimal      1 = slight  
2 = moderate     3 = serious  
4 = severe

\*Mild eye irritant, non-mutagenic and non-carcinogenic. None of the ingredients in Simple Green® are regulated or listed as cancer agents by Federal OSHA, NTP, or IARC.

**IV. FIRST AID MEASURES****SYMPTOMS OF OVEREXPOSURE AND FIRST AID TREATMENT**

- Eye contact:** Reddening may develop. Immediately rinse the eye with large quantities of cool water; continue 10-15 minutes or until the material has been removed; be sure to remove contact lenses, if present, and to lift upper and lower lids during rinsing. Get medical attention if irritation persists.
- Skin contact:** Minimal effects, if any; rinse skin with water, rinse shoes and launder clothing before reuse. Reversible reddening may occur in some dermal-sensitive users; thoroughly rinse area and get medical attention if reaction persists.
- Swallowing:** Essentially non-toxic. Give several glasses of water to dilute; do not induce vomiting. If stomach upset occurs, consult physician.
- Inhalation:** Non-toxic. Exposures to concentrate-mist may cause mild irritation of nasal passages or throat; remove to fresh air. Get medical attention if irritation persists.

**V. FIRE FIGHTING MEASURES**

Simple Green® is stable, not flammable, and will not burn.

Flash Point/Auto-Ignition:	Not flammable.	<b>MSDS # 012261</b>
Flammability Limits:	Not flammable.	
Extinguishing Media:	Not flammable/nonexplosive. No special procedures required.	
Special Fire Fighting Procedures:	None required.	

**VI. ACCIDENTAL RELEASE MEASURES**

Recover usable material by convenient method; residual may be removed by wipe or wet mop. If necessary, unrecoverable material may be washed to drain with large quantities of water.

**VII. HANDLING, STORAGE & TRANSPORT INFORMATION**

No special precautions are required. This product is non-hazardous for storage and transport according to the U.S. Department of Transportation Regulations. Simple Green® requires no special labeling or placarding to meet U.S. Department of Transportation requirements.

UN Number: Not required

Dangerous Goods Class: Non-hazardous

**VIII. EXPOSURE CONTROLS**

**Exposure Limits:** The Simple Green® formulation presents no health hazards to the user when used according to label directions for its intended purposes. Mild skin and eye irritation is possible (please see Eye contact and Skin contact in Section IV.).

**Ventilation:** No special ventilation is required during use.

**Human Health Effects or Risks from Exposure:** Adverse effects on human health are not expected from Simple Green®, based upon twenty years of use without reported adverse health incidence in diverse population groups, including extensive use by inmates of U.S. Federal prisons in cleaning operations.

Simple Green® is a mild eye irritant; mucous membranes may become irritated by concentrate-mist.

Simple Green® is not likely to irritate the skin in the majority of users. Repeated daily application to the skin without rinsing, or continuous contact of Simple Green® on the skin may lead to temporary, but reversible, irritation.

**Medical Conditions Aggravated by Exposure:** No aggravation of existing medical conditions is expected; dermal sensitive users may react to dermal contact by Simple Green®.

**IX. PERSONAL PROTECTION**

<b>Precautionary Measures:</b>	No special requirements under normal use conditions.
<b>Eye Protection:</b>	<b>Caution, including reasonable eye protection, should always be used to avoid eye contact where splashing may occur.</b>
<b>Skin Protection:</b>	No special precautions required; rinse completely from skin after contact.
<b>Respiratory Protection:</b>	No special precautions required.
<b>Work and Hygienic Practices:</b>	No special requirements. Wash or rinse hands before touching eyes or contact lenses.

**X. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance/odor:</b>	Translucent green liquid with characteristic sassafras odor. (Scrubber is green fibrous rectangle.)		
<b>Specific Gravity:</b>	1.0257	<b>Vapor Pressure:</b>	17 mm Hg @ 20 °C; 22 mm Hg @ 25 °C
<b>pH of concentrate:</b>	9.5	<b>Vapor Density:</b>	1.3 (air = 1)
<b>Evaporation:</b>	>1 (butyl acetate = 1)	<b>Density:</b>	8.5 lbs./gallon
<b>Boiling Point:</b>	110 °C (231 °F)		
<b>Freezing Point:</b>	-9 °C (16 °F) If product freezes, it will reconstitute without loss of efficacy when brought back to room temperature and agitated.		

**VOC Composite Partial Pressure:** 0.006 mm Hg @ 20 °C

**Volatile Organic Compounds (VOCs):** 7.96 g/L per ASTM Method 3960-90. Per EPA Method 24, VOCs are 5.9% and product must be diluted at least 1 part of water to 1 part Simple Green® in order to meet CARB 2005 VOC regulations -or 1 part Simple Green to 3 parts water to meet SCAQMD Rule 1171 & Rule 1122 and BAAQMD Regulation 8-16 VOC requirements for solvent cleaning operations.

**Water Solubility:** Completely soluble in water. The higher salt concentrations in marine ecosystems will lead to complexes with Simple Green® that may become visible at ratios above one part Simple Green® to 99 parts seawater.

**Ash Content:** At 600 °F: 1.86% by weight.

**Nutrient Content:** Nitrogen: <1.0% by weight (fusion and qualitative test for ammonia).  
Phosphorus: 0.3% by formula.  
Sulfur: 0.6% by weight (barium chloride precipitation method).

**Detection:** Simple Green® has a characteristic sassafras odor that is not indicative of any hazardous situation.

**XI. STABILITY AND REACTIVITY INFORMATION**

Nonreactive. Simple Green® is stable, even under fire conditions, and will not react with water or oxidizers. Hazardous polymerization will not occur.

**XII. TOXICOLOGICAL INFORMATION****Nonhuman Toxicity****Acute Mortality Studies:**

Oral LD<sub>50</sub> (rat): >5.0 g/kg body weight // Dermal LD<sub>50</sub> (rabbit): >2.0 g/kg body weight

**Dermal Irritation:** Only mild, but reversible, irritation was found in a standard 72-hr test on rabbits. A value of 0.2 (non-irritating) was found on a scale of 8.

**Eye Irritation:** With or without rinsing with water, the irritation scores in rabbits at 24 hours did not exceed 15 (mild irritant) on a scale of 110.

**Subchronic dermal effects:** No adverse effects, except reversible dermal irritation, were found in rabbits exposed to Simple Green® (up to 2.0 g/kg/day for 13 weeks) applied to the skin of 25 males and 25 females. Only female body weight gain was affected. Detailed microscopic examination of all major tissues showed no adverse changes.

**Fertility Assessment by Continuous Breeding:** The Simple Green® formulation had no adverse effect on fertility and reproduction in CD-1 mice with continuous administration for 18 weeks, and had no adverse effect on the reproductive performance of their offspring.

**XIII. BIODEGRADABILITY AND ENVIRONMENTAL TOXICITY INFORMATION****Biodegradability:**

Simple Green® is readily decomposed by naturally occurring microorganisms. The biological oxygen demand (BOD), as a percentage of the chemical oxygen demand (COD), after 4, 7, and 11 days was 56%, 60%, and 70%, respectively. Per OECD Closed Bottle Test, Simple Green® meets OECD and EPA recommendations for ready biodegradability. In a standard biodegradation test with soils from three different countries, Butyl Cellosolve reached 50% degradation in 6 to 23 days, depending upon soil type, and exceeded the rate of degradation for glucose which was used as a control for comparison.

**Environmental Toxicity Information:**

Simple Green® is considered practically non-toxic per EPA's aquatic toxicity scale. Simple Green® is non-lethal to any of the marine and estuarine test animals listed in the following table at concentrations below 200 mg/L (0.02%). This table shows the Simple Green® concentrations that are likely to be lethal to 50% of the exposed organisms.

	LC <sub>50</sub> in mg/L (ppm)	
	48-hour	96-hour
<b>Marine Fish:</b>		
Mud minnow ( <i>Fundulus heteroclitus</i> )	1690	1574
Whitebait ( <i>Galaxias maculatus</i> )	210	210
<b>Marine/Estuarine Invertebrates:</b>		
Brine Shrimp ( <i>Artamia salina</i> )	610	399
Grass Shrimp ( <i>Palaemonetes pugio</i> )	270	220
Green-lipped Mussel ( <i>Perna canaliculus</i> )	220	220
Mud Snail ( <i>Potamopyrgus estuarinus</i> )	410	350

MSDS # 012261

**XIV. DISPOSAL CONSIDERATIONS**

Simple Green® is fully water soluble and biodegradable and will not harm sewage-treatment microorganisms if disposal by sewer or drain is necessary. Dispose of in accordance with all applicable local, state, and federal laws.

**XV. OTHER INFORMATION**

**Containers:** Simple Green® residues can be completely removed by rinsing with water; the container may be recycled or applied to other uses.

**Electrical Wiring Compatibility:** Polyimide insulated wiring is not affected by exposure to Simple Green®. After immersion in Simple Green® for 14 days at 74°F, the 61 cm piece of polyamide insulated wire passed a one minute dielectric proof test at 2500 volts (ASTM D-149).

**Contact Point:** Sunshine Makers, Inc., Research and Development Division: 562-795-6000.

**National Stock Numbers:**

PART#	NSN	SIZE	PART#	NSN	SIZE
13012	7930-01-342-5315	24 oz. spray (12/cs)	13016	7930-01-342-5317	15 gal.
13005	7930-01-306-8369	1 gal. (6/cs)	13008	7930-01-342-4145	55 gal.
13006	7930-01-342-5316	5 gal.	Scrubbing Pad: 10224	7930-01-348-9148	Each (24/cs)

**\*\*\* NOTICE \*\*\***

All information appearing herein is based upon data obtained by the manufacturer & recognized technical sources. Judgments as to the suitability of information herein for purchaser's purposes are necessarily purchaser's responsibility. Therefore, although reasonable care has been taken in the preparation of this information, Sunshine Makers, Inc. or its distributors extends no warranties, makes no representations and assumes no responsibility as to the suitability of such information for application to purchaser's intended purposes or for consequences of its use.

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Tank Farm Maintenance Procedure

MAINTENANCE



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**Radial HEPA Filter Installation, Removal, & Replacement**

PCA Incorporated: TF-2008-0487  
 Procedure Signatures for: 5-VT-710 B-0  
 Type of Change: IDMS Periodic Review process/PCA  
 Review Designator: S  
 USQ Screening Number: TF-08-0060-D, Rev 1

POSITION/ORG	DELEGATE	DATE
Millwright/Maint	<u>Charles L. Lumpkin</u>	<u>03/19/2008</u>
Retrieval Safety	<u>M. T. Hughey</u>	<u>03/12/2008</u>
FWS/Maintenance	<u>Anthony R. Thomas</u>	<u>03/17/2008</u>
Vent/Sys Eng	<u>Greg Gauck</u>	<u>03/28/2008</u>
Technical Writer	<u>S. E. Bevans</u>	<u>03/31/2008</u>
Approval Authority	<u>R. P. Tucker</u>	<u>03/28/2008</u>

**Justification:**  
 IDMS Periodic Review process

**Summary of Changes:**  
 Format updates and identifies changes

**Next Periodic Review Date - 03/31/2012**

The following organization(s) have determined their need to review this procedure at the next periodic review cycle: Technical Authority, Safety, Environmental, and Radiological Control.

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## 1.0 PURPOSE AND SCOPE

### 1.1 Purpose

This procedure provides instructions for removal, installation, and disposal of Radial breather filter on Breather Filter assembly/riser at 241-AZ154, 241-U-301-B, 241-UX-302-A, 244-A catch tank, 244-A catch tank annulus space, 241-ER-311 and the 149 Single Shell Tanks stated in the Radioactive Air Emissions Notice of Construction for Categorical Tank Farm Facility Waste Retrieval and Closure: Phase I Site preparation and system installation.

### 1.2 Scope

This procedure involves filters installed Breather Filter assemblies/risers.

This procedure may be used for installation or replacement of Radial filter(s).

Installation of filter(s) on:

- New Breather Filter assemblies
- New Breather Filter assembly housings

Replacement of filter(s) on:

- Existing Breather Filter assemblies
- Existing Breather Filter assembly housings.

## 2.0 INFORMATION

NONE

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### 3.0 PRECAUTIONS AND LIMITATIONS

#### 3.1 Personnel Safety

WARNING - Removed material should be treated as contaminated. Failure to do so may result in personnel contamination.

- 3.1.1 When there is a potential to contact condensate or tank waste from tanks not listed in Table 1 of TFC-ESHQ-S\_IS-C-02, Personal Protective Equipment, silver shield PPE is required.

#### 3.2 Equipment Safety

CAUTION - Too much twisting torque on the filter mesh material could cause it to crinkle and possibly puncture the filter material.

CAUTION - Cross-threading of filter threads may result in equipment failure.

#### 3.3 Radiation and Contamination Control

- 3.3.1 Work in radiological areas will be performed using a radiological work permit following review by Radiological Control per ALARA Work Planning procedure TFC-ESHQ-RP\_RWP-C-03.
- 3.3.2 The opening of any system or component within a Radiological Area requires the presence of a Health Physics Technician to verify radiological conditions are within RWP limits.
- 3.3.3 All removed materials, liquids, spent cleaning materials and used filter(s) should be treated as contaminated until proven non-contaminated by radiological survey.

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### 3.4 Environmental Compliance

- 3.4.1 All materials are to be managed in accordance with Waste Planning Checklist and TO-100-052.
- 3.4.2 Ensure Waste Planning Checklist is included in work package.
- 3.4.3 The following requirements from TFC-ESHQ-ENV-STD-06 Section 3.3.1 must be met:
1. Do not open pits or risers if sustained winds are greater than 25 mph.
    - A local wind speed measurement device may be used in lieu of Hanford Meteorological Station readings, provided the reading is taken in an unobstructed location that is representative of the work area.
    - Use of a local device and the measured wind speed readings taken from it must be documented in the Work Management System Work Record.
  2. Minimize open riser time using valves, caps, adapters, or plugs as appropriate.
  3. HPT coverage will be performed as specified in the Radiological Work Permit.
  4. Equipment is decontaminated or contained when removed from tanks.
    - Equipment is decontaminated or contained when removed from tanks when  $>50,000$  dpm/100 cm<sup>2</sup> beta/gamma and/or  $>70$  dpm/100 cm<sup>2</sup> alpha.
    - Swipes will be taken to determine that the surface of the item or the outermost surface of the container are maintained  $<50,000$  dpm/100 cm<sup>2</sup> beta/gamma and/or  $<70$  dpm/100 cm<sup>2</sup> alpha.
    - Containments used during the work must be in accordance with TFC-ESHQ-RP\_RWP-C-02 latest revision, Attachment A, Containment Selection Guide.
  5. Pre-job and post-job surveys (smears) shall be taken.
- 3.4.4 Immediately report any spills or releases to Environmental Compliance per the Environmental Compliance On-Call List in accordance with procedure TFC-ESHQ-ENV\_FS-C-01. This includes any water discharge to surface contamination areas.

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### 3.4 Environmental Compliance (Cont.)

3.4.5 Tank Farm Contractor (TFC) Environmental representative and Tank Farm Shift Operations Facility shall be notified in accordance with TFC-ESHQ-ENV\_FS-C-01, Environmental Notifications if:

- The initial field count of an air sample with beta-gamma activity is greater than 0.2 Derived Air Concentration (DAC) and/or
- The initial field count of an air sample with total alpha activity is greater than 5.0 DAC and/or
- Results of 7-day decay count of air samples with a total alpha activity is greater than 0.2 DAC.

Elevated workspace air samples that are suspected to be radon or its daughter products are to be reported to the Environmental On-Call list within 24 hours of field count if radon is NOT confirmed. If the sample decay rate is indicative of radon, whether or not the sample remains above 5 DAC alpha within the 24 hour verification period, notification to the Environmental On-Call list is NOT required. If the decay rate is not indicative of radon, the Environmental On-Call person MUST be notified.

### 3.5 Limits

#### RPP-11413, Technical Basis for Ventilation System Requirements

- Ventilation System Operation and Filtration

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## 4.0 PREREQUISITES

### 4.1 Special Tools, Equipment, and Supplies

The following equipment and materials may be needed to perform this procedure:

- Radial HEPA Filters
- Threaded PVC cap for removed Radial breather filter
- Pipe wrench to fit 1 ½ inch pipe
- Non-regulated anti thread galling material (i.e., Gray Teflon Tape)
- Waste container
- Other tools, equipment and supplies as identified by Shift Manager/OE/FLM/User.

### 4.2 Filter Performance Documents

The following documents will be needed to complete this procedure:

- Applicable filter(s) Installation/Replacement Data Sheet
- Additional copies of Data Sheet 1 for each new filter to be installed.

The following documents may be needed during performance this procedure:

- A-6003-180 Temporary Shielding Authorization Form
- TFC-ESHQ-S\_IS-C-02, Personal Protective Equipment.
- TFC-OPS-MAINT-C-02, Pre-Job Briefing
- TO-100-052, Perform Waste Generation, Segregation, and Accumulation
- Waste Planning Checklist.

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### 4.3 Field Preparation

- 4.3.1 **NOTIFY** Quality Control of filter(s) installation/replacement task, for verification and inspection of replacement filter(s).
- 4.3.2 **ENSURE** pre-job safety briefing, including all involved personnel, per TFC-OPS-MAINT-C-02 has been completed.
- 4.3.3 **IF** Radiation Controls Planning has determined temporary shielding is necessary, **ENSURE** a Temporary Shielding Authorization form (A-6003-180) has been completed.
- 4.3.4 Entries into vapor control zones require SCBA unless alternative controls have been established through a job specific Tank Farm Chemical Exposure Hazard Analysis.

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## 5.0 PROCEDURE

NOTE - Component numbers are prefixed by various combinations of letters and number to designate the facility where the filter is installed (i.e., "B201-WST-").

- During performance of this procedure, tools, equipment and fittings will be removed from and/or inserted into the filter(s) housing. Such items shall be surveyed for radiological contamination prior to and after insertion/removal.
- If performance of any section is not necessary, N/A applicable Data Sheets.

### 5.1 Pre-Installation Filter QC Inspection and Data Recording

NOTE - This section only applies to new filters.

5.1.1 Quality Control Representative, **PERFORM** the following Sub-Steps.

5.1.1.1 **COMPLETE** inspection per Data Sheet 1.

5.1.1.2 **IF** filter does not pass visual inspection, **REQUEST** System Engineer to identify corrective action(s).

5.1.1.3 **IF** filter passes visual inspection, **INITIAL AND DATE** Data Sheet 1.

5.1.2 **DELIVER** filter(s) in its carton and bags to work area.

5.1.3 **IF** existing filter is being replaced, **GO TO** Section 5.2 to remove existing filter(s).

5.1.4 **IF** no filter is currently installed in housing, **GO TO** Section 5.3 to install new filter(s).

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## 5.2 Remove Old Filter(s)

NOTE - This section applies only to the removal of existing filters. For installation of new filters see Section 5.3.

- Figure 1 shows the typical layout of a Radial breather filter assembly on a riser.

5.2.1 **PERFORM** pre-job contamination and radiation surveys of the work area  
**AND**

**RECORD** on Data Sheet 2.

5.2.2 **INSTALL** ground cover.

5.2.3 **IF** flammable gas reading was not taken, **RECORD** in comments section of Data Sheet 3.

5.2.4 **OBTAIN** Shift Manager Permission to close breather filter isolation valve.

NOTE - Valve handle is normally positioned 90 degrees from inlet pipe when closed. The closed position is determined by feeling the valve disc interacting with the valve seat.

5.2.5 **REQUEST** Operations personnel to **ENSURE** filter isolation valve is **CLOSED**.

5.2.6 **CONFIRM** filter isolation valve is **CLOSED**.

5.2.7 **DURING** the entire performance of this procedure, **INSPECT** filter assembly per Data Sheet 3 for discrepancies (i.e., bent/rusted, deformation of the housing, fasteners, gaskets, labels, etc.).

5.2.8 **IF** discrepancies are found, **RECORD** discrepancies in comment section on Data Sheet 3.

5.2.9 **START** work place air sampler.

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## 5.2 Remove Old Filter(s) (Cont.)

### CAUTION

Too much twisting torque on the filter mesh material could cause it to crinkle and possibly puncture the filter material.

5.2.10 UNSCREW wing-nut AND REMOVE weather cover (keep both for later use).

NOTE - Removing the bird screen from the filter assembly will allow access to the threaded pipe nipple.

5.2.11 CAREFULLY LIFT bird screen off filter assembly (keep for later use).

NOTE - A PVC threaded pipe cap can used for additional contamination control and may be optionally used at the discretion of the FWS and HPT.

5.2.12 IF requested by FWS or HPT, STAGE threaded PVC cap.

### WARNING

Removed material should be treated as contaminated. Failure to do so may result in personnel contamination.

5.2.13 USE pipe wrench to loosen Radial breather filter pipe nipple.

5.2.14 ENSURE equipment being removed is decontaminated or contained, AND MEETS the following criteria at the outer-most surface of item or container:

- <50,000 dpm/100 cm<sup>2</sup> beta-gamma
- <70 dpm/100 cm<sup>2</sup> alpha.

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## 5.2 Remove Old Filter(s) (Cont.)

- 5.2.15 **CAREFULLY UNSCREW** contaminated Radial breather filter.
- 5.2.15.1 **UNTIL** radiological conditions have been confirmed, **CONTROL** breached opening with a wet rag.
- 5.2.15.2 **REQUEST** HPT to perform contamination survey of filter connection area, **AND**
- CONFIRM** levels are within RWP limits.
- 5.2.16 **IF** requested by FWS or HPT, **THREAD** PVC cap onto removed Radial breather filter.
- 5.2.17 **PLACE** filter in bag.
- 5.2.18 **SEAL** bag with Radial breather filter inside in accordance with Waste Planning Checklist and TO-100-052.
- 5.2.19 **CONFIRM** exterior contamination levels of bag are within RWP limits.
- 5.2.19.1 **IF** contamination levels of bag exterior are  $>50,000$  dpm/100 cm<sup>2</sup> beta-gamma or  $>70$  dpm/100 cm<sup>2</sup> alpha, **PLACE** into another bag (double bag).
- 5.2.20 **DISPOSE** of filter(s) in accordance with Waste Planning Checklist and TO-100-052.
- 5.2.21 **DURING** the entire performance of this procedure, **INSPECT** filter assembly per Data Sheet 3 for discrepancies (i.e., bent/rusted, deformation of the housing, fasteners, gaskets, labels, etc.).
- 5.2.22 **IF** discrepancies are found, **PERFORM** the following:
- 5.2.22.1 **COVER** riser opening.
- 5.2.22.2 **RECORD** discrepancies in comment section on Data Sheet 3.

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### 5.3 Install New Filter(s)

NOTE - This Section only applies to new filter installations. For removal of existing filter(s) see Section 5.2.

5.3.1 **CONFIRM** Section 5.1 has been completed.

5.3.2 **ENSURE** the following items are available:

- New Filter
- Weather cover (new or saved from Step 5.2.10)
- Wing nut (new or saved from Step 5.2.10)
- Bird Screen (new or saved from Step 5.2.11).

5.3.3 **CONFIRM** pre-job contamination and radiation surveys have been performed and recorded on Data Sheet 2.

5.3.4 **ENSURE** ground cover is installed.

5.3.5 **DURING** the entire performance of this procedure, **INSPECT** filter assembly per Data Sheet 3 for discrepancies (i.e., bent/rusted, deformation of the housing, fasteners, gaskets, labels, etc.).

5.3.6 **IF** discrepancies are found, **RECORD** discrepancies in comment section on Data Sheet 3.

5.3.7 **ENSURE** work place air sampler is operating.

5.3.8 **PERFORM** radiation & contamination survey of housing interior, and exterior, and bird screen,

5.3.9 **DECONTAMINATE** surfaces as needed to  $<10,000$  dpm/100 cm<sup>2</sup> Beta-Gamma and  $<20$  dpm/100 cm<sup>2</sup> Alpha.

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**5.3 Install New Filter(s) (Cont.)**

NOTE - See Figure 1 for filter replacement sketch.

5.3.10 **ENSURE** anti-galling material is applied to filter threads (i.e., Gray Teflon Tape).

**CAUTION**

**Cross-threading of filter threads may result in equipment failure.**

5.3.11 **USE** caution to ensure filter threads do not become cross-threaded, **AND CAREFULLY INSTALL** new Radial breather filter to hand-tightness.

5.3.12 **USE** pipe wrench **AND TIGHTEN** Radial breather filter pipe nipple.

5.3.13 **PERFORM** radiation & contamination survey of housing interior and exterior.

5.3.14 **DECONTAMINATE** surfaces as needed to <10,000 dpm/100 cm<sup>2</sup> Beta-Gamma and <20 dpm/100 cm<sup>2</sup> Alpha.

5.3.15 **INSTALL** bird screen over new Radial breather filter.

5.3.16 **WHILE** ensuring bird screen alignment up into the weather cover, **INSTALL** weather cover and wing nut.

NOTE - Valve handle normally aligns with inlet pipe when open.

5.3.17 **REQUEST** Operations personnel to **FULLY OPEN** filter isolation valve, and if valve is fitted with latching device, to ensure mechanical latch is used.

5.3.18 **INFORM** Shift Manager of valve status.

5.3.19 **STOP** work place air sampler.

5.3.20 **PERFORM** post-job contamination and radiation surveys of the work area, **AND**

**RECORD** on Data Sheet 2.

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## 5.4 Restoration

- 5.4.1 IF old filter was removed, **TRANSFER** used filter(s) and absorbed liquid to Operations for disposal per Waste Planning Checklist and TO-100-052.
- 5.4.2 IF new filter(s) was installed, craftsmen **SIGN AND DATE** on Data Sheet 3 to indicate new filter(s) is successfully installed.

## 5.5 Acceptance Criteria

NOTE - This section only applies to new filter installations.

- 5.5.1 FWS/Lead **CONFIRM** Data Sheet 1, Data Sheet 2, and Data Sheet 3 entries are complete.
- 5.5.2 FWS/Lead **NOTIFY** Environmental Compliance, radial filter has been installed and the valve is open, **AND**  
**DOCUMENT** on Comment Page, Environmental representative contacted and date.

## 5.6 Review

- 5.6.1 FWS/Lead **NOTIFY** Shift Manager of equipment status (valve positions, and inspection results).
- 5.6.2 IF discrepancies were noted during inspection that may have contributed to failure of the filter(s), FWS **NOTIFY** System Engineer, **AND**  
**OBTAIN** concurrence to initiate a work package.
- 5.6.3 FWS/Lead **RECORD** on Data Sheet 4 any work request numbers generated during the performance of this procedure, **AND**  
**NOTIFY** System Engineer of any deficiencies.
- 5.6.4 FWS/Lead **SIGN AND DATE** Data Sheet 4.
- 5.6.5 FWS/Lead **INFORM** Shift Manager field work is complete.

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## 5.7 Records

NOTE - The following records are generated during the performance of this procedure and are maintained in the CHAMPS work package as record material.

Record Description*	Vital Record Y/N	QA Record Y/N	QA Record Retention L/NP/NA	NARA Retention Schedule	Other Retention Requirements	Records Custodian
Data Sheet 1 through Data Sheet 4	N	Y	L	ADM-17.32A	N	Work Control Organization
Comment Page	N	Y	L	ADM-17.32A	N	Work Control Organization

\* The identified record custodian is responsible for record management in accordance with TFC-BSM-IRM\_DC-C-02 or other applicable requirements.

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Data Sheet 1 - QC Inspection Data

Radial HEPA Filter Change out QC Data Sheet*		
Filter component number where HEPA Filter will be Installed (i.e., B201-WST-FLT-101)	SEE DATA SHEETS IN	
Work Package Number	FOLDERS	
Date of Inspection	_____	
Radial HEPA Filter (Record Information From Manufacturer's Label)		
Filter Manufacturer		
Model Number (identify letter designation of filter to indicate which drawing revision filter is fabricated to.)	O-007-1-12-RF-NU-00-E3-Z04059	
Serial Number		
HEPA Filter Flow Rating	N/A (CFM)	
HEPA Filter Resistance		
Manufacturer's Penetration Test Date		
Verify Filter Aerosol Penetration Has Been Tested by the Manufacturer and is No Greater than 0.03% at 100% of Rated Flow	SAT	UNSAT**
Seal (thread) Condition (No significant damage or cross threading, etc.)	SAT	UNSAT**
Comment: See work package C10-W0-08-0579 for SX101 Data sheet. See work package C10-W0-05-0580 for SX103 Data sheet. SDoss 4-21-08		

\* Additional copies of this data sheet shall be made for each individual filter installed by this procedure.

\*\* Any UNSAT conditions found should be described on Comment Page, and the System Engineer should be notified.

QC Inspector: SEE SPECIFIC DATA SHEETS IN FOLDERS  
 Signature \_\_\_\_\_ Print Name \_\_\_\_\_ Date \_\_\_\_\_

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## Data Sheet 2 - Daily Survey Data

Daily Survey Data Sheet*				
Condition	Number	Date	Time	Initials
Pre-Job contamination and radiation survey number:	N/A			
Post-Job contamination and radiation survey number:	N/A			
Comments: See work package CLO-WO-05-0579 for SX-101 Data Sheet. See work package CLO-WO-05-0580 for SX-113 Data Sheet. <div style="text-align: right;">             Sloss              4-21-08           </div>				

\* Additional copies of this data sheet shall be made as needed by this procedure.

Data Sheet 3 - Filter Installation Data

Radial HEPA Filter Change-out Data Sheet*			
Work Package Number			
Date of Installation		N/A	
Flammable Gas Concentration		IHT Initials and date	
Record Filter EIN/Component Number (e.g., xxxx-VTP-FLT-001)			
<b>Inspect for:</b>		SAT	UNSAT**
No Damage to New HEPA Filter			
No Damage to Filter Weather Covers			
No Damage to Filter Threads			
No Damage to Bird Screen			
Bird Screen properly Installed (including alignment with weather cover)			
No Missing Fasteners		N/A	
No Missing Labels on Filter Assembly or Weather Covers			
Filter Isolation valve operates properly			
No Water In Filter			
No Visible Paint, Corrosion, or Other Foreign Objects In Filter Assembly			
New Filter Installed Properly with No Discrepancies			
Comment: See work package CLO-40-08-0579 for SX-101 Data sheet. See work package CLO-40-08-0510 for SX-113 Data sheet SPASS 4-21-08			

- \* Additional copies of this data sheet shall be made for each individual filter installed by this procedure.
- \*\* Any UNSAT conditions found should be described on Comment Page, a PER should be generated by the FWS for all UNSAT conditions, a work request should be generated by the FWS for all UNSAT conditions to correct the problem, and the System Engineer should be notified.

Craftsman: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 Signature: N/A / Print Name: / Date: \_\_\_\_\_

Craftsman: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_  
 Signature: / Print Name: / Date: \_\_\_\_\_

Data Sheet 4 - FWS/Engineering/Environmental Review

PER Numbers Generated (if Applicable):		
N/A		
Work Request Numbers Generated (if Applicable):		
N/A		
FWS:		
Signature	Print Name	Date
Forward package to System Engineer for review and signature.		
System Engineer:		
Signature	Print Name	Date
N/A		
Forward package to Environmental for review and signature.		
Environmental:		
Signature	Print Name	Date
N/A		

See work package CLO W0-08-0579 for  
SX-101 Data Sheet.

See work package CLO-W0-08-0580 for  
SX-113 Data sheet.  
Stass  
4-21-08

**Comment Page**

*(This page may be reproduced as necessary)*

Record below any comments encountered during performance of the procedure, and a description of any degraded conditions found and resulting actions taken. Also explain any UNSAT conditions described in Data Sheet 1 or Data Sheet 3

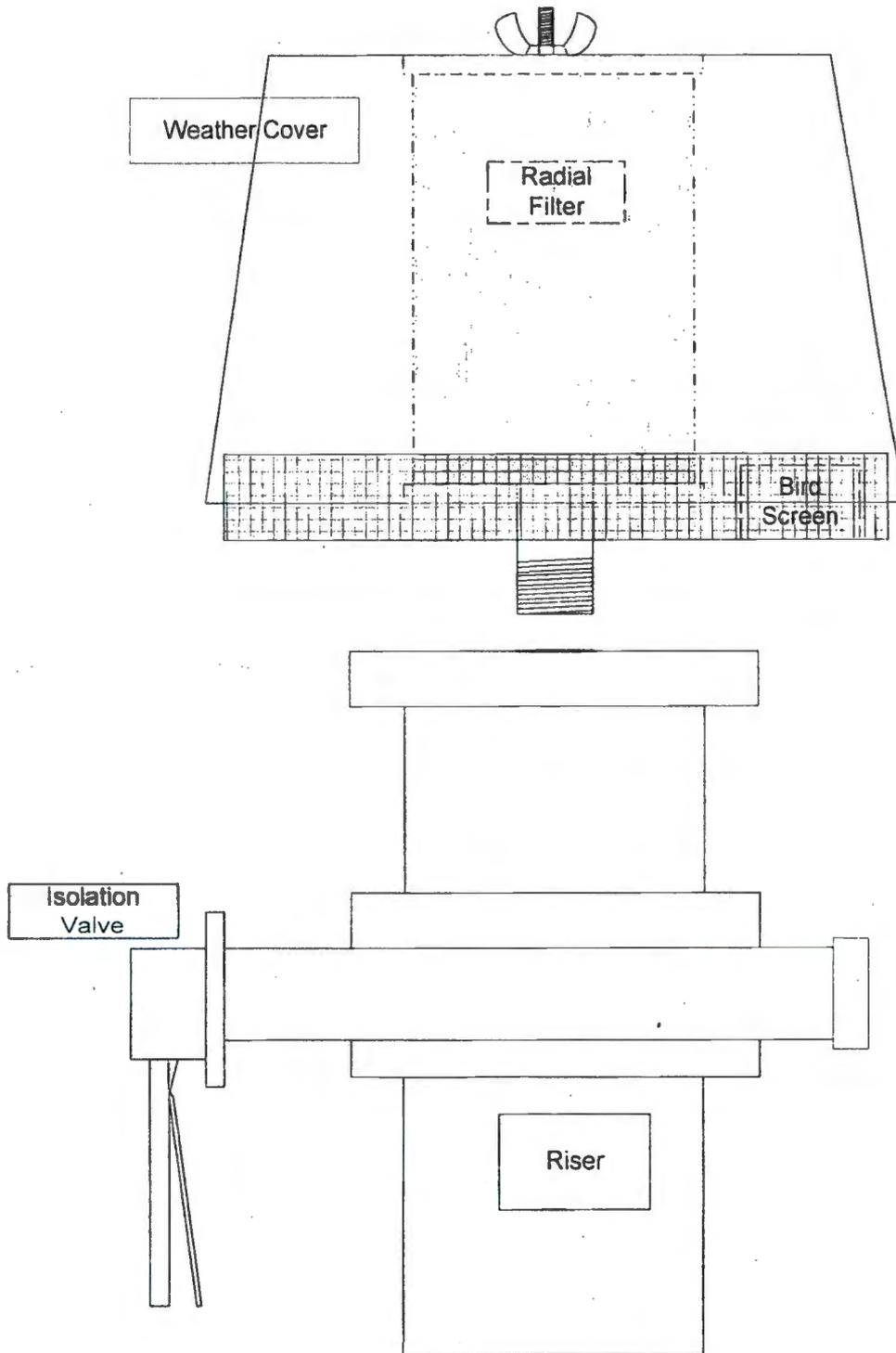
Date: 4-21-08

DATA sheets 1, 2, 3, and 4 for SX-101 are contained in work package CLO-WO-08-0599.

DATA sheets 1, 2, 3, and 4 for SX-113 are contained in work package CLO-WO-08-0580.

JLASS  
4-21-08

Figure 1 - Flanders Filter Components



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**CLO-WO-08-0564**  
**241-SX-113 REPLACE BREATHER FILTER WITH RADIAL FILTER**

**1.0 SCOPE**

- 1.1. Replace the existing 241-SX-113 open face Breather Filter housing with new Radial Breather Filter Assembly 350 per ECN-7255507 Rev 0. Install a new Radial HEPA filter.
- 1.2. The PM Work Order CLO-WO-08-0580 to install the new radial HEPA filter 241-SX-113 will be worked in conjunction with this work order.
  - This is a standard work order that is medium radiological risk.

**TASKS**

- 1.2.1. PREASSEMBLE the Radial Filter assembly and 4" valve into Assembly 350, H-2-90718 Sheet 25.
- 1.2.2. PERFORM the initial Radial Flow Breather Filter Assembly Post-Installation Inspection.
- 1.2.3. PERFORM pre-job contamination and radiation surveys of the work.
- 1.2.4. REMOVE the old Breather Filter assembly from Riser 6 at SX-113 from the valve up.
- 1.2.5. INSTALL the new Radial Filter Assembly with Butterfly Valve on Riser 6.
- 1.2.6. INSTALL a new HEPA filter on the new Radial Filter Assembly.
- 1.2.7. PERFORM post-job contamination and radiation surveys.
- 1.2.8. COMPLETE the Radial Flow Breather Filter Assembly Post-Installation Inspection Checklist.
- 1.2.9. DISPOSE of the old Breather Filter Housing.
- 1.2.10. CLEAN-UP Job Site.

**CLO-WO-08-0564**  
**241-SX-113 REPLACE BREATHER FILTER WITH RADIAL FILTER**

**2.0 LIMITATIONS and PRECAUTIONS**

- 2.1. To ensure adequate contamination control and worker protection, at no time is it acceptable to breach systems containing radioactive materials without the use of engineering controls, respiratory protection and/or appropriate personal protective clothing. Approved engineered controls include: ventilation, containments, glovebags, sleeving, tents, glove boxes, fixatives, damp/dry rags and or spritzing methods. Deviation from this process requires approval by the applicable facility Radiological Control Director and the corresponding Line Management Director.
- 2.2. This work package will utilize radiological limits and controls specified in Radiation Work Permit RWP CO-469.
- 2.3. SX Farm has local Vapor Control Zones (VCZs) at the breather filters. VCZ can be downposted per the Tank Farm Chemical Exposure Hazard Analysis 0408-324.
- 2.4. Do not breach a radioactive system if sustained winds are > 25mph.
- A local wind speed measurement device may be utilized in lieu of Hanford Meteorological Station, provided the reading is taken in an unobstructed location that is representative of the work area.
  - Use of a local device and the measured wind speed must be documented in the Work Record (Ref. TFC-ESHQ-ENV-STD-06).
- 2.5. Equipment is decontaminated or contained when removed from tanks.
- Equipment is decontaminated or contained when removed from tanks when >50,000 dpm/100 cm<sup>2</sup> beta/gamma or > 70 dpm/100 cm<sup>2</sup> alpha.
  - Swipes will be taken to determine that the surface of the item or the outermost surface of the container are maintained <50,000 dpm/100 cm<sup>2</sup> beta/gamma and < 70 dpm/100 cm<sup>2</sup> alpha.

**CLO-WO-08-0564**

**241-SX-113 REPLACE BREATHER FILTER WITH RADIAL FILTER**

- [ ] 2.6. In the event of a spill of propylene glycol or water, notify Environmental On-Call in accordance with TFC-ESHQ-ENV\_FS-C-01, Environmental Notification.
- [ ] 2.7. FWS to prepare a route map of the vehicle and/or equipment routes and locations prior to entry into the tank farm.
- [ ] 2.8. No change to the dome load log is required. Removal of the old filter and replacement with a new Radial Filter assembly results in negligible weight change.
- [ ] 2.9. If the work directions and/or documents are confusing, conflicting, or not understood, contact FWS for clarification. If the work instructions/procedures are incorrect, request a change prior to proceeding. (Lessons Learned Bulletin # SN-98-09).
- [ ] 2.10. Tank Farm Contractors (TFC) Environmental representative and Tank Farm Shift Operations Facility shall be notified, in accordance with TFC-ESHQ-ENV\_FS-C-01, Environmental Notification, if:
- The initial field count of an air sample with a Beta-Gamma activity is greater than 0.2 DAC and/or
  - The initial field count of an air sample with Alpha activity is greater than 5.0 DAC and/or
  - A result of a 7 day decay count of air samples with a total Alpha activity is greater than 0.2 DAC.

Elevated workspace air samples that are suspected to be radon or its daughter products are to be reported to the Environmental On-Call list within 24 hours of field count if radon is **NOT** confirmed. If the sample decay rate is indicative of radon, whether or not the sample remains above 5 DAC alpha within the 24 hour verification period, notification to the Environmental On-Call list is **NOT** required. If the decay rate is not indicative of radon, the Environmental On-Call person **MUST** be notified.

**CLO-WO-08-0564**  
**241-SX-113 REPLACE BREATHER FILTER WITH RADIAL FILTER**

**3.0 PREREQUISITES**

**NOTE:**

Work steps within Section 3.0 "Prerequisites" may be performed in any order and/or concurrently.

- 3.1. **PREASSEMBLE** the Radial Filter assembly (stored in the 2701HV warehouse) so that Assembly 350 can be staged for the Inspection Checklist acceptance.
  - 3.1.1. **INSTALL** the gaskets onto the new radial breather filter assembly.
  - 3.1.2. **ENSURE** bolts are lubricated prior to installation.
  - 3.1.3. **INSTALL** the bolts and nuts and **TORQUE** to 84 +/-5 ft-lbs.

Torque Wrench

M&TE # 389-88-01-003 Calibration Due Date 8/2/08

KA Baird [Signature] 4-16-08  
Signature (Print & Sign) Date

- 3.2. **ENSURE** the Radial HEPA filter installation package CLO-WO-08-0580 is ready for work.
- 3.3. **ENSURE** EIN label SX113-WST-FLT-101 has been made and applied to the assembly prior to installation.
- 3.4. **ENSURE** label has been installed on the radial filter weather cover.

"H-2-90718 Sheet 25, ASSY 350"

in ½" black letters per H-2-90718 Sheet 2, Note 7.

**CLO-WO-08-0564**  
**241-SX-113 REPLACE BREATHER FILTER WITH RADIAL FILTER**

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- 3.5. FWS **NOTIFY** QAT prior to the new filter assembly being staged in the field.
- 3.6. QAT **PERFORM** applicable portions of the Radial Flow Breather Filter Assembly Post-Installation Inspection Checklist.
- 3.7. The following equipment and tools may be needed for performing this task:
- Hand tools for disconnecting or cutting the old filter assembly and valve.
  - Plastic, rubber, sleeving, drape material
  - Absorbent material
  - Decon materials
  - Bag tie-off / horse-tail materials (tape, straps, cutting tools)
  - New Radial filter assembly (PM Work Order CLO-WO-08-0580)
- 3.8. **ENSURE** material / equipment / components are staged for installation.
- 3.9. FWS **ENSURE** the correct waste containers and supplies are available to perform the work activities as stated on the Waste Planning Checklist. (TO-100-052)
- 3.10. FWS **ENSURE** a pre-job briefing is conducted in accordance with TFC-OPS-MAINT-C-02 before field work is performed.
- 3.11. FWS **ENSURE** a walkdown is conducted using the work instructions and Worksite Hazard Analysis with as many of the work crew as possible who will be performing the job to ensure the work instructions/hazard controls are adequate.
- 3.12. **ENSURE** all shipping and packing material is removed from new equipment prior to installation (IB-06-008).

**CLO-WO-08-0564**  
**241-SX-113 REPLACE BREATHER FILTER WITH RADIAL FILTER**

**4.0 SPECIFIC WORK INSTRUCTIONS**

4.1. HPT **PERFORM** pre-job radiation and contamination survey of work area.

COF-007342                      4/16/08  
RSR (SURVEY) Number                      Date

[ ] 4.1.1. **RECORD** subsequent radiological surveys on the Work Record.

4.2. **ENSURE** that the isolation valve for the existing filter is **CLOSED**.

4.3. **INSTALL** ground cover around riser 6.

4.4. **REMOVE** the ground wire from the breather filter housing and cut or disconnect from the splice point at the flange.

4.5. **ESTABLISH** ARA in work area.

**ENSURE Open Face Filter Housing Is Drained**

**WARNING**

Care should be taken when removing liquids accumulated in filter housing. Removed material should be treated as contaminated. Failure to do so may result in contamination spread.

b

**CLO-WO-08-0564**  
**241-SX-113 REPLACE BREATHER FILTER WITH RADIAL FILTER**

4.6. **DRAIN** filter housing as follows:

4.6.1. **PLACE** plastic bag with absorbent or sleeve under filter and housing or just under filter.

4.6.2. **REMOVE OR LOOSEN** fasteners and cover/lid.

4.6.3. **PERFORM** radiological survey, **AND**  
**ENSURE** levels are within RWP limits.

4.7. With the assistance of the Crane & Rigging crew, **REMOVE** the existing Breather Filter Housing Assembly (ECN-725507 R-0). The existing breather filter will be removed down to and including the 4" butterfly valve.

4.7.1. **REMOVE** fasteners from the flanges at the butterfly valve.

4.7.2. **REMOVE** the Breather Filter Assembly.

4.7.2.1. **BAG/CONTAIN** the filter housing openings as it is being removed.

4.7.2.2. **DOUBLE BAG** the filter and seal the bag. The outermost surface of the containers or items are to be <50,000 dpm/100cm<sup>2</sup> beta-gamma and <70 dpm/100 cm<sup>2</sup> alpha.

4.7.3. **REMOVE** the butterfly valve.

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**WARNING:**

**Due to shine from the riser, hands shall be kept away  
from the open riser as much as possible.**

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**CLO-WO-08-0564**  
**241-SX-113 REPLACE BREATHER FILTER WITH RADIAL FILTER**

- 4.8. **CONTROL** the inside of the riser as an HCA.
  
- 4.9. **INSTALL** a temporary cover on the riser, when the riser is open and not being worked on.
  
- 4.10. **INSTALL** the new radial breather filter assembly and isolation valve on Riser 6.  
(Reference ECN-724507 R-0).
  - 4.10.1. **INSTALL** the gasket onto the new radial breather filter assembly.
  
  - 4.10.2. **ENSURE** bolts are lubricated prior to installation.
  
  - 4.10.3. **INSTALL** the bolts and **TORQUE** to 84 +/-5 ft-lbs.

Torque Wrench

M&TE # 389-88-01-003 Calibration Due Date 8/2/08

KA Bard [Signature] 4/16/08  
FWS Signature (Print & Sign) Date

- 4.11. **DOWNPOST** the ARA as survey dictates.
  
- 4.12. **ENSURE** the Radial HEPA filter installation was performed per Work Order CLO-WO-08-0580.

**CLO-WO-08-0564**  
**241-SX-113 REPLACE BREATHER FILTER WITH RADIAL FILTER**

4.13. QAT **PERFORM** applicable portions of the Radial Flow Breather Filter Assembly Post-Installation Inspection Checklist.

4.14. HPT **PERFORM** post-job radiation and contamination survey(s) of the work area.

COF-7342  
RSR Survey Number

4-16-08  
Date

4.15. **ENSURE** the seal loop is filled with oil (MSDS 010835 or 021537).

4.16. **PERFORM** work area clean-up.

4.17. **ENSURE** new radial filter assembly isolation valve SX-113-WST-V-103, is **OPEN**.

4.18. **ENSURE** that Environmental Compliance was notified that the filter is installed and the isolation valve is open.

4.19. **ENSURE DISPOSAL** of the waste per the Waste Planning Checklist.

4.20. QC **RE-VERIFY** torque after approximately 24 hours (TORQUE to 84 +/-5 ft-lbs)

Torque Wrench

M&TE # 389-89-01-003

Calibration Due Date 8-2-08

KA Ber. A  
FWS Signature

[Signature]  
(Print & Sign)

4-17-08  
Date

**CLO-WO-08-0564**  
**241-SX-113 REPLACE BREATHER FILTER WITH RADIAL FILTER**

[X] 4.21. FWS **RECORD** on the Work Record that the job site has been walked down and the area is orderly and all applicable waste has been placed in the proper containers.

[X] 4.22. FWS **RECORD** Field Work Completion in CHAMPS.

**5.0 POST MAINTENANCE TESTING**

[X] 5.1. Post Maintenance Data Sheet WT-106315, Radial HEPA filter installation, is performed in this Work Order.

**6.0 RESTORATION AND POST REVIEW**

[X] 6.1. QC **VERIFY** that a QC Inspector has signed and completed the Radial Flow Breather Filter Assembly Post-Installation Inspection Checklist.

<u>K. Willoughby</u>	<u>K. Willoughby</u>	<u>4/17/08</u>
QAT Name	Signature	Date

[X] 6.2. System Engineer **ENSURE** that the old Data Sheets WT-03722 and WT-06754 have been discontinued and new Data Sheet WT-106315 has been activated.

<u>Gregory J. Ganche</u>	<u>[Signature]</u>	<u>4-21-08</u>
Engineering Name	Signature	Date

10

**CLO-WO-08-0564**  
**241-SX-113 REPLACE BREATHER FILTER WITH RADIAL FILTER**

- 6.3. System Engineer **ENSURE** ECN-725507 R-0 has been closed and a copy of the "MODIFICATION COMPLETE" cover page has been inserted into the work package. Complete closeout review.

Gregory J. Gauck      [Signature]      4-21-08  
Engineering Name      Signature      Date

- 6.4. **FORWARD** the Work Order package to the Operations Engineer for OPS Acceptance.
- 6.5. Operations Engineer **COMPLETE** OPS Acceptance.

**NOTE**

The following steps may be worked concurrently, in parallel and/or in any order. RESTORATION AND POST REVIEW steps are not required to be completed to consider the Work Order "Field Work Complete" by the FWS or for Operations Acceptance of the work order. These steps need to be completed prior to Post Review approval.

- 6.6. Radiological Control SME determine if ALARA Review trigger levels were exceeded and if an ALARA Review is required.

J.B. Holcomb      [Signature]      4/29/08  
Rad Con SME Print/Sign      Date

Required: \_\_\_\_\_ Not Required: X

- 6.6.1. As applicable, FWS or Planner schedule and perform an ALARA review meeting to complete as soon as possible, not to exceed 30 calendar days from field work complete.

**CLO-WO-08-0564**  
**241-SX-113 REPLACE BREATHER FILTER WITH RADIAL FILTER**

[ ] 6.7. RADCON SME to **CLOSE** the RWP in the ACES system, if no longer needed.

S.B. Holcomb                      S.B. Holcomb                      4/29/08  
Rad Con SME                      Print                      /                      Sign                      Date

[ ] 6.8. ENVIRONMENTAL **PERFORM** closeout review.

Shelly Lass                      /                      Shelly Lass                      4-24-08  
ENVIRONMENTAL Print                      /                      Sign                      Date

[ ] 6.9. **FORWARD** the Work Order package to the Planner for Post Review.

RPP WORK RECORD

1. Document Number:

CLO-WO-08-0564

2. Work Item Title: 241-SX-113 REPLACE BREATHER FILTER WITH RADIAL FILTER

Date	Turnover, Problem Description, Action Taken	Feed Back (X)	Name	Craft/Resource Type	Hours
4-15-08	Walkdown performed, QC bought off materials, gathered supplies ready for field work.		Barcl	FWS	2
4-16-08	Procedures held, replaced breather filter with radial filter, some notified, Environmental notified shelly class, Isolation valve open, need to retorque after 24 hours		Barcl	FWS	7
4-17-08	Retorqued bolts, area walkdown performed, clean and disposed of waste		Barcl	FWS	7
4-17-08	QAT : NOTE: NEW VALVES DO NOT HAVE NEW VALVE LABELS OLD LABELS TRASHED	X	K. Whiting	97	
4-21-08	Entered copy of Mod Work Complete ECN 7255 into Work Package following field walkdown.		Barcl	ENG	3
4/29/08	NO ALARA REVIEW IS REQUIRED		Barcl	RAD Con ENG	

Summary by Craft/Resource Type

Craft/Resource Type	Total Hours	Craft/Resource Type	Total Hours

**CLO-WO-08-0564**  
**241-SX-113 REPLACE BREATHER FILTER WITH RADIAL FILTER**  
**(AND BUTTERFLY VALVE)**

Attachment  
**Radial Flow Breather Filter Assembly Post-Installation Inspection**  
**Checklist**

Purpose: Visual inspection is used to assess items such as surface condition, alignment of mating surfaces, shape, or evidence of other damage.

Scope: Visual inspections shall be performed on the breather filter assembly components and interconnecting ductwork as outlined in the following checklists (make additional copies as needed). The inspections are limited to items that are readily accessible, without disassembly (for example, many items are not easily assessed inside the completed assemblies). Some radial filters may also be assembled onto new wye assemblies. Because disassembly is not desirable, especially after installation, the inspections should occur and be documented during fabrication and pre- and post-installation activities (as applicable). Items that were previously inspected (e.g., by the manufacturer) cannot be inspected or are not applicable shall be indicated as such on the checklist, with justification/evidence given in the comments column as appropriate (do not delete items from the checklists).

Acceptance Criteria: Unless otherwise noted in the following checklists, **conditions are considered acceptable when there is no visual indication of improper installation, physical damage, structural distress or degradation that would impair the ability of the component/system to perform its intended function.**

Required Inspector: Quality control shall complete (as applicable) and sign each data sheet.

Originated by:

Signature Required:

 / Gregory J. Gauck  
Retrieval Closure Ventilation System Engineer

4/11/2008

Date



TR FARRIS

4-16-08

**VISUAL INSPECTION CHECKLIST**  
**DAMPERS (including valves used as dampers)**  
**Butterfly valve on ductwork (Assembly for Radial Flow Filter)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
DM-1	Housing and duct interface	ASME AG-1, Section TA-I-1200 (a)	KW 4/16/08	No housing. Duct interface only.
DM-2	Actuator linkage, motor, controller	ASME AG-1, Section TA-I-1200 (b)	N/A	Valve design does not have any actuator linkages, motors, or controller.
DM-3	Interferences with moving parts	ASME AG-1, Section TA-I-1200 (c)	N/A (completed via other inspection or process)	The only moving parts are internal to the damper, verified through functional testing.
DM-4	Damper shaft seal	ASME AG-1, Section TA-I-1200 (d)	N/A	Valve design has no damper shaft.
DM-5	Blade edge seals, damper seat	ASME AG-1, Section TA-I-1200 (e)	N/A (completed via other inspection or process)	Seal integrity is verified by testing per ASME B16.34 and verified during procurement activities. Vacuum decay testing also ensures adequate seal during field installation.
DM-6	Limit switches	ASME AG-1, Section TA-I-1200 (f)	N/A	Valve design has no limit switches.
DM-7	Supports and attachments	ASME AG-1, Section TA-I-1200 (g)	N/A	Valve design has no supports or attachments other than its interface with the duct (wey assembly) to which it bolts (covered in DM-1).
DM-8	Bolting and fasteners	ASME AG-1, Section TA-I-1200 (h)	KW 4/17/08	1ST TORQUE KW 4/16/08 2ND TORQUE /
DM-9	Instrumentation	ASME AG-1, Section TA-I-1200 (i)	N/A	Valve design has no instrumentation.
DM-10	Electrical connections	ASME AG-1, Section TA-I-1200 (j)	N/A	Valve design has no electrical connections.

**VISUAL INSPECTION CHECKLIST**  
**DAMPERS (including valves used as dampers)**  
**Butterfly valve on ductwork (Assembly for Radial Flow Filter)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
DM-11	Pneumatic connections	ASME AG-1, Section TA-I-1200 (k)	N/A	Valve design has no pneumatic connections.
DM-12	As built configuration in accordance with design drawings	ASME AG-1, Section TA-I-1200 (l)	N/A (completed via other inspection or process)	Normal engineering and work control processes perform this function.
DM-13	Damper nameplate	ASME AG-1, Section TA-I-1200 (m)	KW 4/16/08	Valve damper see H-2-90718 Sht.10 latest rev. See PN=171 ITEM NUMBER 171 on SHT 15.
DM-14	Provisions for access for performing tests and maintenance	ASME AG-1, Section TA-I-1200 (n)	KW 4/16/08	

NOTE ON  
ITEM  
722.  
TRFAPRS  
7-16-08.

Quality Control (print name, signature, date):

K. WILLOUGHBY / K. Willoughby 4/17/08

**VISUAL INSPECTION CHECKLIST**  
**TANK-TO-BREATHER FILTER CONNECTING DUCTWORK**  
**(Mounting Flange Subassembly)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
DW-1	Housing and duct connections (no caulking)	ASME AG-1, Section TA-I-1300 (a)	KW 4/16/08	Mounting flange subassembly- to- riser connection.
DW-2	Provision for opening access doors from both inside and outside	ASME AG-1, Section TA-I-1300 (b)	N/A	By design, there are no doors.
DW-3	Access door seals, gaskets	ASME AG-1, Section TA-I-1300 (c)	N/A	By design, there are no doors.
DW-4	Access door latches	ASME AG-1, Section TA-I-1300 (d)	N/A	By design, there are no doors.
DW-5	Housing internal access ladders and platforms	ASME AG-1, Section TA-I-1300 (e)	N/A	By design, there is no housing.
DW-6	Sample and injection ports, location and caps	ASME AG-1, Section TA-I-1300 (f)	N/A	By design, there are no test ports.
DW-7	Supports and attachments	ASME AG-1, Section TA-I-1300 (g)	N/A	Connection to riser addressed in DW-1. There are no separate supports or attachments.
DW-8	Bolting and fasteners	ASME AG-1, Section TA-I-1300 (h)	KW 4/17/08	1st Torque KW 2nd Torque 4/16/08
DW-9	Instrumentation connections	ASME AG-1, Section TA-I-1300 (i)	N/A	By design, there are no instrumentation connections.
DW-10	Electrical connections	ASME AG-1, Section TA-I-1300 (j)	N/A	By design, there are no electrical connections.
DW-11	Housing/duct penetration seals	ASME AG-1, Section TA-I-1300 (k)	N/A	By design, there is no housing.

**VISUAL INSPECTION CHECKLIST**  
**TANK-TO-BREATHING FILTER CONNECTING DUCTWORK**  
**(Mounting Flange Subassembly)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
DW-12	Loop seals (water level), drain connections	ASME AG-1, Section TA-I-1300 (l)	N/A	By design, there are no loop seals or drain lines.
DW-13	Lighting conduits, socket housing seals (flush mounted)	ASME AG-1, Section TA-I-1300 (m)	N/A	By design, there are no lighting conduits.
DW-14	HEPA/adsorber mounting frame continuous seal welds	ASME AG-1, Section TA-I-1300 (n)	N/A	By design, there is no mounting frame.
DW-15	Mounting frame penetrations seal welded	ASME AG-1, Section TA-I-1300 (o)	N/A	By design, there is no mounting frame.
DW-16	Mounting frame seating surface (weld splatter, flatness, scratches)	ASME AG-1, Section TA-I-1300 (p)	KW 4/16/08	By design, there is no mounting frame. This is for inspection of the threaded hole in the flange.
DW-17	Sample canister installation	ASME AG-1, Section TA-I-1300 (q)	N/A	By design, there is no sample canister.
DW-18	Mounting frame clamping devices	ASME AG-1, Section TA-I-1300 (r)	N/A	By design, there is no mounting frame.
DW-19	As built configuration in accordance with design drawings	ASME AG-1, Section TA-I-1300 (s)	N/A (completed via other inspection or process)	Normal engineering and work control processes perform this function.
DW-20	Provisions for access for performing tests and maintenance	ASME AG-1, Section TA-I-1300 (t)	KW 4/16/08	Verify filter will be accessible for replacement. No tests required.

**VISUAL INSPECTION CHECKLIST  
TANK-TO-BREATHER FILTER CONNECTING DUCTWORK  
(Mounting Flange Subassembly)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
DW-21	Lighting for test and maintenance available	ASME AG-1, Section TA-I-1300 (u)	N/A	Not applicable to this assembly (facility or portable lighting used as necessary).

Quality Control (print name, signature, date):

*K. WILLOUGHBY / K. Willoughby 4/17/08*

**VISUAL INSPECTION CHECKLIST  
EXHAUSTER HEATER/FILTER/TEST HOUSINGS  
(Radial Flow HEPA Filter)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
EH-1	Housing and duct connections (no caulking)	ASME AG-1 Section TA-I-1300 (a)	N/A	By design, there is no housing.
EH-2	Provision for opening access doors from both inside and outside	ASME AG-1 Section TA-I-1300 (b)	N/A	By design, there are no doors.
EH-3	Access door seals, gaskets	ASME AG-1 Section TA-I-1300 ©	N/A	By design, there are no doors.
EH-4	Access door latches	ASME AG-1 Section TA-I-1300 (d)	N/A	By design, there are no doors.
EH-5	Housing internal access ladders and platforms	ASME AG-1 Section TA-I-1300 (e)	N/A	By design, there is no housing.
EH-6	Sample and injections ports, location and caps	ASME AG-1 Section TA-I-1300 (f)	N/A	By design, there are no injection ports.
EH-7	Supports and attachments	ASME AG-1 Section TA-I-1300 (g)	N/A	By design, there are no supports or attachments.
EH-8	Bolting and fasteners	ASME AG-1 Section TA-I-1300 (h) and section TA-I-1600 (g)	N/A	By design, there is no bolting/fasteners.
EH-9	Instrumentation connections	ASME AG-1 Section TA-I-1300 (i)	N/A	By design, there are no instrumentation connections.
EH-10	Electrical connections	ASME AG-1 Section TA-I-1300 (j)	N/A	By design, there are no electrical connections.

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**VISUAL INSPECTION CHECKLIST  
EXHAUSTER HEATER/FILTER/TEST HOUSINGS  
(Radial Flow HEPA Filter)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
EH-11	Housing/duct penetration seals	ASME AG-1 Section TA-I-1300 (k)	N/A	By design, there is no housing.
EH-12	Loop seals (water level), drain connections	ASME AG-1 Section TA-I-1300 (l)	N/A	By design, there is no loop seal or drain.
EH-13	Lighting conduits, socket housing seals (flush mounted)	ASME AG-1 Section TA-I-1300 (m)	N/A	By design, there are no lighting conduits/seals.
EH-14	HEPA/adsorber mounting frame continuous seal welds	ASME AG-1 Section TA-I-1300 (n)	N/A	By design, there is no mounting frame.
EH-15	Mounting frame penetrations seal welded	ASME AG-1 Section TA-I-1300 (o)	N/A	By design, there is no mounting frame.
EH-16	Mounting frame seating surface (weld splatter, flatness, scratches)	ASME AG-1 Section TA-I-1300 (p)	KW 4/16/08	There is no mounting frame. This is for inspection of the threaded nipple of the radial flow filter.
EH-17	Sample canister installation	ASME AG-1 Section TA-I-1300 (q)	N/A	A sample canister is not used in this application.
EH-18	Mounting frame clamping devices	ASME AG-1 Section TA-I-1300 ®	N/A	No mounting frame clamping devices.
EH-19	As built configuration in accordance with design drawings	ASME AG-1 Section TA-I-1300 (s) and Section TA-I-1600 (h)	N/A (completed via other inspection or process)	By design, there is no housing. HEPA filter configuration is controlled via vendor drawings.

**VISUAL INSPECTION CHECKLIST  
EXHAUSTER HEATER/FILTER/TEST HOUSINGS  
(Radial Flow HEPA Filter)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
EH-20	Provisions for access for performing tests and maintenance	ASME AG-1 Section TA-I-1300 (t) and Section TA-I-1600 (j)	N/A	By design, there is no test or maintenance required.
EH-21	Lighting for test and maintenance available	ASME AG-1 Section TA-I-1300 (u)	N/A	By design, there is no test or maintenance required.
EH-22	Moisture separator media, frame, clamps, and gaskets	ASME AG-1 Section TA-I-1600 (a)	N/A	Moisture separator is not part of this design.
EH-23	Moisture separator water collection system and drains	ASME AG-1 Section TA-I-1600 (b)	N/A	Moisture separator is not part of this design.
EH-24	Prefilter media, frame, clamps, and gaskets	ASME AG-1 Section TA-I-1600 ©	N/A	By design, there is no prefilter.
EH-25	HEPA filter media, frame, clamps, and gaskets	ASME AG-1 Section TA-I-1600 (d)	KW 4/16/08	By design, there are no clamps or gaskets. Inspect filter media and frame.
EH-26	Sealant or caulking (none allowed)	ASME AG-1 Section TA-I-1600 (e)	KW 4/16/08	Anti-galling media (gray Teflon tape) approved for use on threaded nipple on filter. This is covered by the procedure (5-VT-710) used for the filter installation activity.
EH-27	Moisture separator, prefilter, HEPA orientation (vertical)	ASME AG-1 Section TA-I-1600 (f)	N/A	By design, the HEPA filter cannot inadvertently be installed in the incorrect orientation. There is no moisture separator or prefilter.

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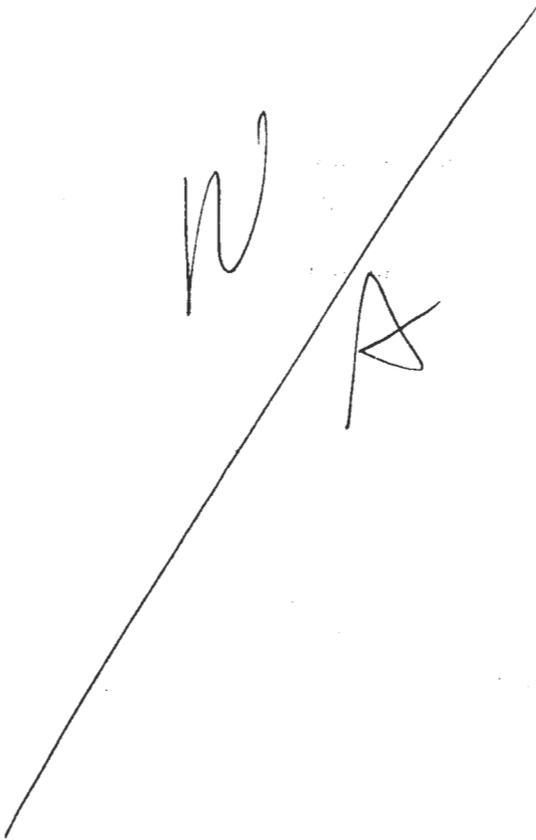
**VISUAL INSPECTION CHECKLIST  
EXHAUSTER HEATER/FILTER/TEST HOUSINGS  
(Radial Flow HEPA Filter)**

Item #	Inspection Item	Requirement Reference	QC Acceptance (initial & date)	Comments (use comments continuation sheet as needed)
EH-28	HEPA filter nameplate	ASME AG-1 Section TA-I-1600 (i)	KW 4/16/08	This data is recorded on the 5-VT-710 data sheet for filter replacement. * SX113-WST-FLT-101
Quality Control (print name, signature, date): K. WILLOUGHBY / <i>K. Wiloughby</i> 4/17/08				

\* 0-007-1-12-RF-NU-00-53-204059 C S/N # 1463462

RE, KW 4/16/08

Visual Inspection Comments Continuation Sheet  
(make additional copies as needed)

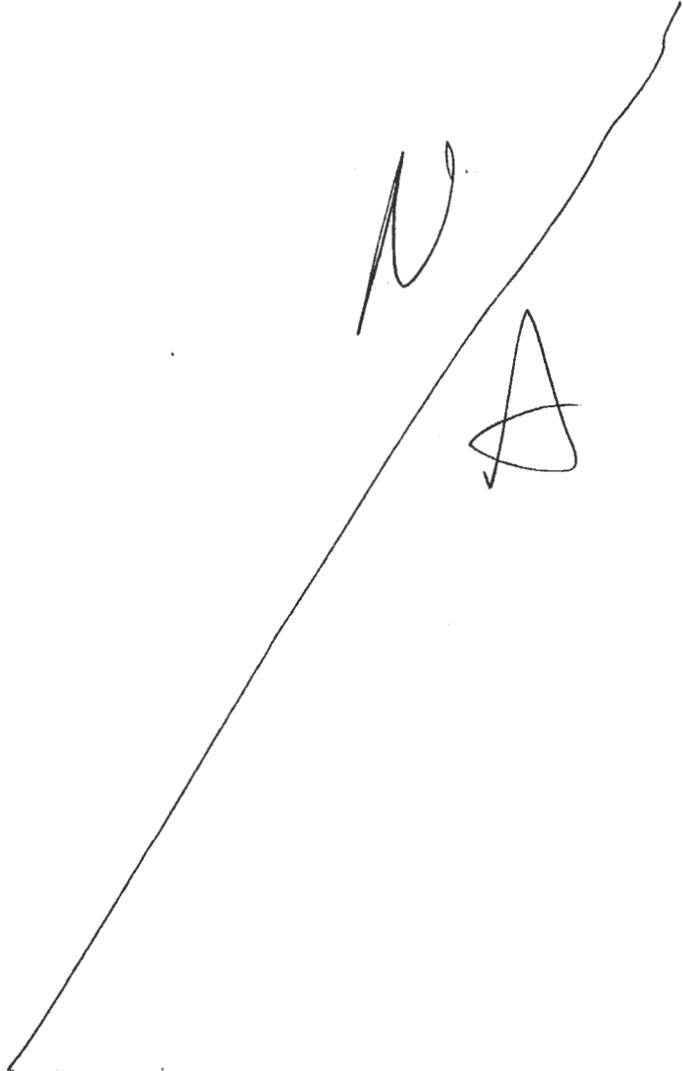
Item #	Comments/Resolution	Name/Date
		

Quality Control (print name, signature, date):

K. W. [Signature]

4/17/08

Visual Inspection Comments Continuation Sheet  
(make additional copies as needed)

Item #	Comments/Resolution	Name/Date
		

Quality Control (print name, signature, date):

BW 4/17/08

# RADIOLOGICAL WORK PERMIT

Contractor: **CH2M HILL Harjot Group, Inc.**  
 RWP Number: **CO-469**  
 Technical Document Number: **CLO-WO-08-0563/ CLO-WO-08-0564**  
 AMW Number: **AW-1411**

General: [ ] Start Date: **04/15/2008** End Date: **10/14/2008**  
 Job Specific: [X]

Job Location: **200W/241 -SX/SX-101&113** Brief Job Description and Type of Area: **Replace Breather Filters with Radial Filters (RA,CA, HCA, ARA)**

Radiation Emitted	Estimated Dose Rates	Estimated Contamination Levels	Job Dose Estimate	Risk Value
[X] Alpha [X] Beta [X] Gamma [ ] Neutrons	General Area: 0.5 mrem/hr Maximum Contact: 3 mrem/hr	Beta/Gamma: 100,000 dpm/100cm <sup>2</sup> Alpha: < 20 dpm/100 cm <sup>2</sup>	< 200 person-mrem	MEDIUM
Radiological Worker [ ] I Training Req. [X] II		Internal Dosimetry Requirements [ ] 3 minute WBC [X] 10 minute WBC [SI 5] Urinalysis/Isotopes [SI 5] Chest Count		

DOSIMETRY		PERSONAL PROTECTIVE EQUIPMENT			SURVEY REQUIREMENTS	
X	HSD-TLD	X	Coveralls		SI 8	Grab Air Sampling Required
	HCND-TLD		Waterproof Suit	X	SI 8	Lapel Air Sampling Required
X	Pocket Dosimeter		Goretex Suit	X	SI 7	Auto. Survey Device
	Electronic Dosimeter		Cap		SI 7	Self Survey (if qualified)
	Finger Rings	SI 6	Hood			HPT Exit Survey Required
	Time Keeping	SI 6	Surgeon's Gloves	SI 6		
X	Entry Control System	SI 6	Leather Gloves		HPT COVERAGE	
	Brick	SI 6	Canvas & Surgeon's Gloves		SI 4	Continuous
	-Day ACES Auth.		Waterproof Gloves		SI 4	Intermittent
		SI 6	Arm Sleeves			
			Leaded Gloves			

### SPECIAL INSTRUCTIONS

- VOID LIMITS**
  - RA: Whole Body dose rate  $\geq 100$  mrem/hr @ 30 cm.
  - CA: General area removable contamination levels  $\geq 100,000$  dpm/100 cm<sup>2</sup> beta-gamma or  $\geq 210$  dpm/100 cm<sup>2</sup> alpha.
  - HCA: General area removable contamination  $\geq 400,000$  dpm/100cm<sup>2</sup> Beta-Gamma or  $\geq 200$  dpm/100cm<sup>2</sup> Alpha.
- SAFE CONDITION LEVELS**  
**IF a Safe Condition Level is met, stop normal work activities, place the work area in a stable condition, perform the actions stated within the associated Safe Condition Level AND notify the RadCon First Line Manager and Shift Operations Manager that a Safe Condition Level was reached or exceeded.**
  - RA: Whole body dose rate  $\geq 80$  mrem/hr, establish/post HRA boundary and secure work activities.
  - CA: General area removable contamination levels  $\geq 80,000$  dpm/100cm<sup>2</sup> beta-gamma or  $\geq 140$  dpm/100cm<sup>2</sup> alpha; establish/post HCA boundary and secure work activities.
  - HCA: General area removable contamination  $\geq 200,000$  dpm/100cm<sup>2</sup> Beta-Gamma or  $\geq 150$  dpm/100cm<sup>2</sup> Alpha., decontaminate to less than these levels
- ACTION LEVELS**
  - CA: General area removable contamination levels  $\geq 50,000$  dpm/100cm<sup>2</sup> beta-gamma or  $\geq 70$  dpm/100cm<sup>2</sup> alpha, decontaminate or apply fixative to reduce contamination to below these levels prior to continuing work activities.
  - HCA: General area removable contamination  $\geq 50,000$  dpm/100cm<sup>2</sup> beta-gamma or  $\geq 70$  dpm/100cm<sup>2</sup> alpha, decontaminate to below these levels.
- HPT COVERAGE**
  - Continuous HPT coverage is required when removing/replacing filter components
  - Intermittent HPT coverage is required during set-up and clean-up
- DOSIMETRY/ACES**
  - Personnel performing hands on work with contaminated components shall ACE in with the appropriate GW or WW Role and the COBIO Role.
- Personnel wearing respiratory protection for radiological purposes shall ACE in with the appropriate respirator role.
- PERSONAL PROTECTIVE EQUIPMENT**
  - HCA: Arm sleeves and an additional pair of gloves required for reaching inside HCA.
  - CA: Single set of PPE with surgeons gloves and canvas, leather or cannery gloves required for entry.
  - A hood will be required when:
    - a worker's head has a potential to contact contaminated surfaces.
    - contamination may drop from above due to overhead work.
    - When wearing a respirator
- SURVEY**
  - Beta-Gamma and Alpha surveys required during the course of all intrusive work:
    - Alpha surveys of personnel and equipment required if alpha contamination was detected during the course of performing work.
    - Alpha survey required if Beta-Gamma contamination is detected.
  - Auto Survey Device (ASD) requirements:
    - If ASD does not have alpha survey capabilities for areas requiring dual personnel surveys, perform a whole body Alpha survey prior to entering ASD.
    - If ASD is inoperable or unavailable, perform whole body survey(s). Perform a follow-up survey in an operable ASD.
- AIR SAMPLING**
  - Work place grab air sampling required when removing/replacing filter components
  - Lapel air sampling required when personnel are wearing respiratory protection for radiological purposes
- SPECIAL PREJOB BRIEFING**
  - None required
- OTHER**
  - N/A

**COPY**

RWP Prepared By: **S.B. Holcomb** Phone: 373-1263 HPT Phone: 373-3353, 373-0303

Line Mgt. Print: **KA Baird** Sign: *[Signature]* Phone: **438-9255** Date: **4/15/08**

RC Sup. Initial: **JUD** RC Dir. Print: **James Dupuy** Sign: *[Signature]* Phone: **372-2833** Date: **4/15/08**

Acknowledged by: AJRG Chair (High Risk) Print: Sign: Date: Other: Print: Sign: Date:

RWP Field Change Approvals: Line Mgt. Print: Sign: Date: RC Mgt. Print: Sign: Date:

*26*

**TANK FARM CHEMICAL EXPOSURE HAZARD ANALYSIS**  
Breather Filter and Radial Filter Replacement in SX Farm

0408-324

**Summary:**

Existing vapor control zones (VCZ) can be down posted during work associated with breather and radial filter replacement in SX Farm based upon the following hazard assessment as per TFC-ESHQ-S\_IH-CD-48, *Managing Vapor Control Zones*.

**Work Activity/Task:**

1. Replace breather filters with radial filters
2. Periodically replacing radial filters with new ones
3. The work activities do not require waste-disturbing activities.

**Comparable Activities:**

Personal air sampling performed at SX Farm vapor sources during various corrective and preventive maintenance as well as vent and balance activities showed no exposure measurements approaching 10% of the SX Farm Chemicals of Potential Concern (7X100-JWJ-07-006, *Results of Personal Air Sampling Conducted in S-Complex Tank Farms from November 2004-October 2006*).

**Hazard Identification:**

1. The hazardous gases and vapors potentially generated in the S-Complex Tank Farms waste tanks during non-waste disturbing activities were identified during S-Complex Chemicals of Potential Concern (COPC) Characterization air sampling and are documented in RPP-22491, *Industrial Hygiene Chemical Vapor Technical Basis*.
2. The COPC chemicals identified in S-Complex Tank Farms were ammonia, nitrous oxide, and nitrosamines.

**Data Review:**

1. Review of the TFIH database for air sampling and monitoring
2. Personal air sampling results for representative work activities conducted in S-Complex tank farms from 11/04 – 03/08 showed no COPC exceeded 10% of the Tank Farm Occupational Exposure Limits. (TFIH database query dated 03/28/08) and

# TANK FARM CHEMICAL EXPOSURE HAZARD ANALYSIS

## Breather Filter and Radial Filter Replacement in SX Farm

0408-324

7X100-JWJ-07-006, *Results of Personal Air Sampling Conducted in S-Complex Tank Farms from November 2004-October 2006.*

3. S-Complex COPC air sampling showed that no COPC exceeded 50% of the Tank Farm occupational exposure limit in the work areas, 5 ft. from any recognized vapor source.

### Vapor Hazard Controls:

1. This hazard analysis is limited to the following tanks in SX Farm: SX-101, -102, -103, -104, -105, -106, -108, -113, -115 which do not require the use of Silver Shield® gloves (per TFC-ESHQ-S\_IS-C-02). A dermal exposure hazard analysis shall be performed in conjunction with a chemical exposure hazard analysis prior to initiating work in vapor control zones associated with other SX tanks.
2. Chemical Exposure Hazard Analysis (CEHA) 0108-302 applies vapor hazard controls required when replacing breather and radial filters per procedures 5-VT-710 and 5-VT-076.
3. The IHT will conduct air sampling and monitoring as per 7X100-JWJ-08-059, *Air Monitoring and Air Sampling Plan For S, SX And SY-Farm Work Activities.*
4. If IHT monitoring detects ammonia concentrations exceeding the Tank Farm Chemical Action Limit in the work area during the operation, the work will be paused and the workers placed in a safe location and the issue resolved before the work proceeds. If area ammonia levels remain above the chemical action limits for 15 minutes, a vapor control zone will be reestablished around the breather filter.

Title:	Name:	Signature:	Date:	Phone:
Industrial Hygienist:	WL Adams	<i>WL Adams</i>	4/14/08	372-3053
IH Reviewer:	DL Merrill	<i>DL Merrill</i>	4/14/08	
IH Manager:	KA Roueché	<i>Kim Roueche</i>	4/14/08	372-3310
Operations Manager:	JW Ficklin	<i>JW Ficklin</i>	4/14/08	372-3312

*JA*

## ATTACHMENT A – PPE SELECTION CRITERIA AND GUIDANCE (cont.)

Table 1. Tanks Not Requiring Silvershield PPE.

241-A-101	241-BX-104	241-SX-102
241-A-102	241-BX-105	241-SX-103
241-AN-101	241-BX-107	241-SX-104
241-AN-102	241-BX-109	241-SX-105
241-AN-103	241-BX-110	241-SX-106
241-AN-104	241-BX-111	241-SX-108
241-AN-105	241-BX-112	241-SX-113
241-AN-106	241-BY-101	241-SX-115
241-AN-107	241-BY-102	241-SY-101
241-AP-101	241-BY-103	241-SY-102
241-AP-102	241-BY-104	241-SY-103
241-AP-103	241-BY-105	241-T-102
241-AP-104	241-BY-106	241-T-104
241-AP-105	241-BY-107	241-T-105
241-AP-106	241-BY-108	241-T-107
241-AP-107	241-BY-109	241-T-109
241-AP-108	241-BY-110	241-T-111
241-AW-101	241-BY-111	241-T-112
241-AW-102	241-BY-112	241-T-201
241-AW-103	241-C-101	241-T-202
241-AW-104	241-C-102	241-T-203
241-AW-105	241-C-103	241-T-204
241-AW-106	241-C-104	241-TX-104
241-AX-101	241-C-105	241-TX-113
241-AX-102	241-C-106	241-TX-116
241-AX-103	241-C-107	241-TX-118
241-AX-104	241-C-108	241-TY-104
241-AY-101	241-C-109	241-TY-106
241-AY-102	241-C-110	241-U-102
241-AZ-101	241-C-111	241-U-103
241-AZ-102	241-C-112	241-U-105
241-B-101	241-C-201	241-U-106
241-B-102	241-C-202	241-U-107
241-B-103	241-C-203	241-U-108
241-B-104	241-C-204	241-U-109
241-B-106	241-S-101	241-U-110
241-B-107	241-S-102	241-U-111
241-B-108	241-S-103	241-U-112
241-B-109	241-S-104	241-U-201
241-B-110	241-S-105	241-U-202
241-B-111	241-S-106	241-U-203
241-B-201	241-S-107	241-U-204
241-B-202	241-S-109	
241-B-203	241-S-110	
241-B-204	241-S-111	
241-BX-101	241-S-112	
241-BX-103	241-SX-101	



# River Protection Project



RPP Main | Emergency Security | Waste Services | SWE Personnel Readiness | Performance Assurance | Procedures and Training  
 General Information | Admin Resource Center | Communications | Human Resources | Operations | Safety - Health Programs  
 Engineering Resources | Business - Financial | Projects | Project Delivery | 222 S - Labs ATS ATL | Strat Plng and Proj Ctrls  
 Nuc. Safety and Licensing | Environmental Programs



## RPP Lessons Learned



# Information

### Equipment Installed with Shipping Material Interferences

Bulletin Date: Mar 23 2006 12:00AM      Bulletin Number: IB-06-008

**Lessons Learned Statement:** Equipment installed without removing shipping materials caused interference with the intended design.

**Discussion of Activities:** During maintenance activities, drain lines were discovered to be taped over in boxes installed to house C-200 tank Articulating Mast Systems. The drain holes had been taped over either as a cleanliness measure prior to installation or to eliminate vapors in the box during vacuum line tie-in. Similarly, a ring holding the adjustable weight system for the C-103 vacuum controller system was discovered to be taped to its housing. The ring had been taped to prevent it from moving during shipment and the tape was not removed following installation.

**Analysis:** Although failure of other barriers or simultaneous abnormal conditions would have had to occur to cause equipment problems, failure to inspect the new systems for shipping materials following installation could have contributed to operational problems. Neither instance had Authorization Basis implications.

**Recommended Actions:** Inspect newly installed equipment and components for the presence of shipping materials prior to operation.

**References:** PER-2005-4109, PER-2005-3769

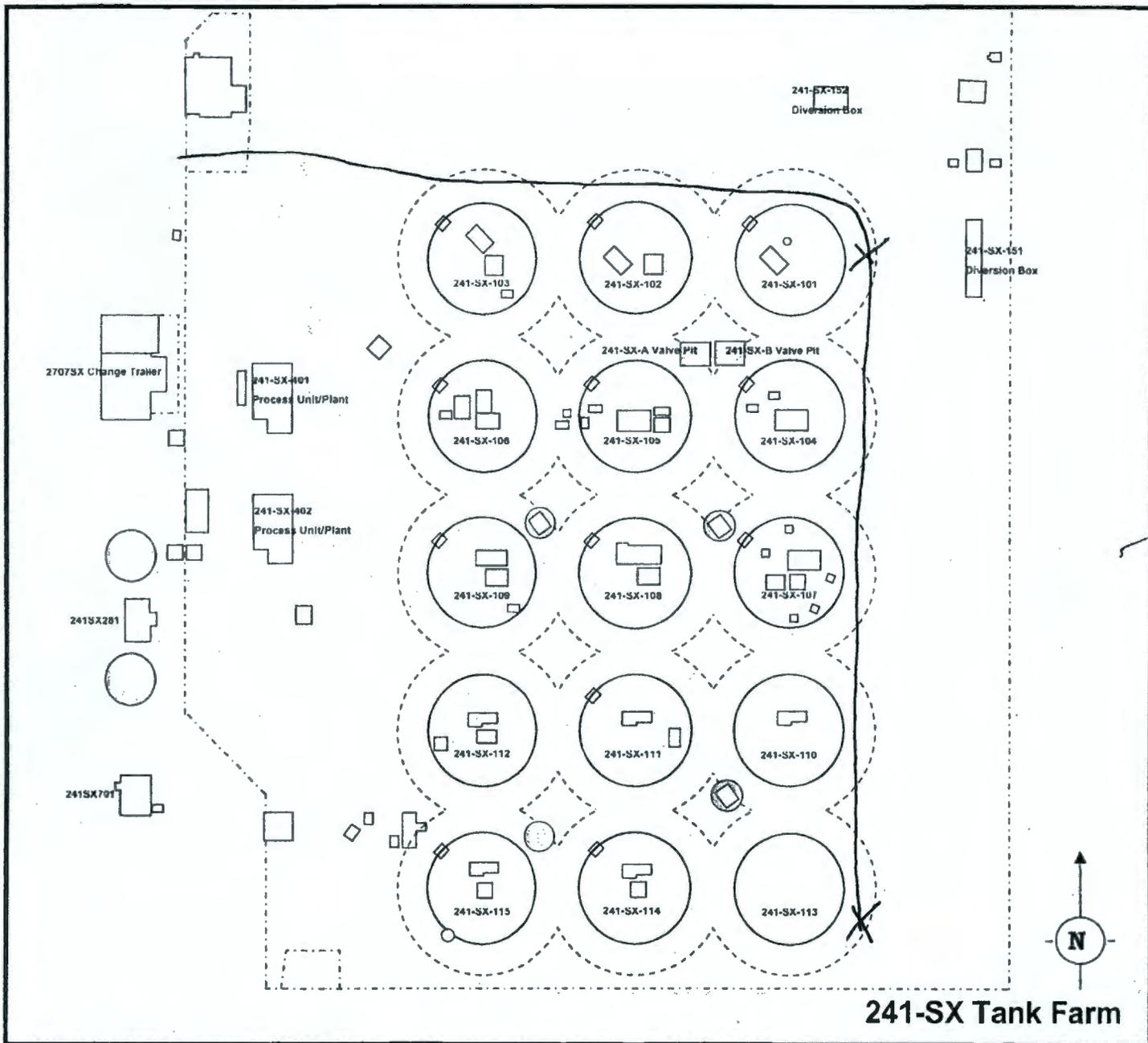
**Originator:** David Saueressig, 373-0183

**Key words:** AMS, Ventilation, Shipping Material

**Distribution:** All CH2M HILL Managers, Operations

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ATTACHMENT A – TANK FARM VEHICLE ROUTE MAP



241-SX Tank Farm

If a vehicle travels through the exclusion zones or over the domes of other tanks to reach the work location, the dome load log for each affected tank shall be updated as required by Section 4.3, step 11.

Remarks: 75 ton (130K lbs), Step Van (15K lbs)

Preparer KA Baird

Date 4-15-08

Field Work Supervisor KA Baird

Date 4-15-08

Engineering \_\_\_\_\_

Date \_\_\_\_\_

Required for double shell tank farms except for 241-SY)  
Shift Manager [Signature]

Date 4/16/08

Waste Planning Checklist

- 1. Will waste be generated?  Yes
- 2. Will waste be generated in a radiological buffer area or contamination area?  Yes
- 3. Will EQ be removed? (TF-cover blocks, 222S-Process EQ)  Yes
- 4. Will waste contact process waste, tank waste, or tank waste contaminated material?  No
- 5. Will work involve soil removal?  No
- 6. Will there be any aerosol can(s) disposed of?  Yes
- 7. Will asbestos waste be disposed of?  No
- 8. Will HEPA filters be disposed of?  Yes
- 9. Will chemical products or paint be used or disposed of?  No
- 10. The following waste minimization techniques will be used?  Source reduction and waste segregation

CHEMICAL/PAINT PRODUCTS

Msd No	Chemical / Product Name
020641	SAFEGARD 5022A
012261	SIMPLE GREEN
012664	WD-40
014786	CERTANA 1000
010835	Dow Corning 200, 100 CST
021537	Dow Corning 200, 20 CST
014258	Kroil Penetrating Oil
023671	Quick n Brite

11. GENERAL DESCRIPTION OF WASTE

Breather filter assembly including the butterfly valve. Approximately 80 lbs.  
 - HEPA filter, condensate : ~40 lbs  
 - Rags, plastic, tape : ~20 lbs  
 - Gasket, bolts, nuts, and misc. parts: ~20 lbs

11a. Estimate Waste Generated Quantity: 160 LBS Per: Day Job Length 1 day

WASTE MANAGEMENT CONTROLS

Comments

12. Is Waste Regulated as a Dangerous Waste?  No

12a. Disposition Instructions:

- Bring into the radiation zone only materials/products needed for the job.
- Survey and release unused products, then return to stock for future use.
- Survey and release empty or unusable aerosol cans for disposal as hazardous waste or non-regulated waste. Waste generator must complete a "Radiological Evaluation for Release" (A-6004-227) or "RCRA/TSCA Waste Radiological Release" (A-6004-228). If necessary, contact TF Waste Operations dispatch for additional information.
- Ensure all free liquids, if present, are stabilized with approved stabilizer.

Low Level Waste Disposal:

- Dispose of debris waste with incidental contact with condensate or contains small amount of the products listed above (<5% by wt.) in the nearest low-level waste (LLW) collection container/shed.
- HEPA filter should be disposed of as low level waste.

General Disposal Instructions:

- Package waste, including asbestos, in accordance with procedure TO-100-052.
- Ensure to limit the weight of each waste bag to 40 lbs. for easy and safe handling.
- FWS to request containers and ensure delivery prior to the start of the job.

Designation Note:

1. WD-40, Kroil and Safeguard 5022A are regulated as products, but on debris in small quantity (<5% by wt.) are no longer regulated. Debris waste contaminated with >5% by wt. of the above products should be managed as mixed waste.
2. Simple Green, Certana 1000, Quick n' Brite, Dow Corning 200, 100 CST, Dow Corning 200, 20 CST are not regulated products.
3. Condensation of vapors and deposition of particulates from uncontained gasses from the tank vapor space does not constitute mixing under RCRA, and therefore listed waste codes would not apply to ventilation system components such as ductwork, HEPA filters and housings.

- 13. Facility Operations has been notified to take samples? (N/A if not required)  N/A
- 14. Is a container already available for each disposition listed in the instructions?  No
- 15. Does the quantity of the waste exceed capacity of available containers?  No
- 16. Identify satellite accumulation area or accumulation area container(s) locations: 241-SX LLW Collection Container

Prepared By: Mandrake Pascual

Date: 04/11/2008

Complete:

# WORK RELEASE CHECKLIST FOR OE'S

(For Operations Pre-Release Review)

Work Package No.: CLO-WO-08-0564 Reviewed By: A.L. WORACE Date: 4-14-8

Title: 241-SX-113 REPLACE BREATHER FILTER WITH RADIAL FILTER

**Document Check:**

- | N/A                              | YES                              |   |
|----------------------------------|----------------------------------|---|
| <input type="radio"/>            | <input checked="" type="radio"/> | Work Instructions                                       |
| <input checked="" type="radio"/> | <input type="radio"/>            | Data Sheets   |
| <input type="radio"/>            | <input type="radio"/>            | BOM   |
| <input type="radio"/>            | <input checked="" type="radio"/> | CACN listed   |
| <input checked="" type="radio"/> | <input type="radio"/>            | Hold Points   |
| <input type="radio"/>            | <input checked="" type="radio"/> | Waste Planning Checklist                                |
| <input type="radio"/>            | <input checked="" type="radio"/> | WHA / JSA   |
| <input type="radio"/>            | <input checked="" type="radio"/> | Pre-Job Safety Meeting form                             |
| <input type="radio"/>            | <input checked="" type="radio"/> | Attendance Roster                                       |
| <input type="radio"/>            | <input checked="" type="radio"/> | RWP   |
| <input checked="" type="radio"/> | <input type="radio"/>            | ALARA Management Worksheet                              |
| <input checked="" type="radio"/> | <input type="radio"/>            | OTP (Operational Test Procedure)                        |
| <input checked="" type="radio"/> | <input type="radio"/>            | ATP (Acceptance Test Procedure)                         |
| <input type="radio"/>            | <input checked="" type="radio"/> | USQ Eval. # ( <u>TF-08-0640-5-Ra</u> ) <i>cont. exc</i> |
| <input type="radio"/>            | <input checked="" type="radio"/> | ECNs (# <u>725507-R0</u> )<br>(# _____) (# _____)       |
| <input type="radio"/>            | <input checked="" type="radio"/> | Reference Drawings                                      |
| <input checked="" type="radio"/> | <input type="radio"/>            | Lockout / Tagout Authorization or AWT form prepared     |
| <input checked="" type="radio"/> | <input type="radio"/>            | Asbestos Work Permit / Negative Exposure Assessment     |
| <input checked="" type="radio"/> | <input type="radio"/>            | Hot Work Permit (fire watch required)                   |
| <input checked="" type="radio"/> | <input type="radio"/>            | Confined Space Entry Permit                             |
| <input checked="" type="radio"/> | <input type="radio"/>            | Non-Permit Confined Space monitoring form               |
| <input checked="" type="radio"/> | <input type="radio"/>            | Excavation Permit                                       |
| <input checked="" type="radio"/> | <input type="radio"/>            | Ground Scan   |
| <input checked="" type="radio"/> | <input type="radio"/>            | EEWP  |
| <input checked="" type="radio"/> | <input type="radio"/>            | Procedures  |
| <input type="radio"/>            | <input checked="" type="radio"/> | Vehicle Route Map                                       |
| <input checked="" type="radio"/> | <input type="radio"/>            | Critical Lift Procedure                                 |
| <input checked="" type="radio"/> | <input type="radio"/>            | Hoisting and Rigging Information                        |
| <input type="radio"/>            | <input checked="" type="radio"/> | MSDS Sheets   |
| <input checked="" type="radio"/> | <input type="radio"/>            | Glove Bag / Containment Form                            |
| <input checked="" type="radio"/> | <input type="radio"/>            | Ignition Source Control Requirements Screening          |
| <input checked="" type="radio"/> | <input type="radio"/>            | Standing Orders   |

**Limiting Conditions for Operation (LCOs):**

- | N/A                              | YES                   |  |
|----------------------------------|-----------------------|--|
| <input checked="" type="radio"/> | <input type="radio"/> | 3.1.1 Transfer Leak Detection Systems                            |
| <input checked="" type="radio"/> | <input type="radio"/> | 3.1.2 Backflow Prevention Systems                                |
| <input checked="" type="radio"/> | <input type="radio"/> | 3.2.1 DST Primary Ventilation Systems                            |
| <input checked="" type="radio"/> | <input type="radio"/> | 3.2.2 SST Flammable Gas Concentration                            |
| <input type="radio"/>            | <input type="radio"/> | 3.2.3 SST 241-B-203 and 241-B-204<br>Passive Ventilation Systems |

**Administrative Controls (ACs):**

- | N/A                              | YES                   |                                      |
|----------------------------------|-----------------------|--------------------------------------|
| <input checked="" type="radio"/> | <input type="radio"/> | 5.10 Flammable Gas Controls          |
| <input checked="" type="radio"/> | <input type="radio"/> | 5.11 Transfer Controls               |
| <input checked="" type="radio"/> | <input type="radio"/> | 5.12 Administrative Lock Controls    |
| <input checked="" type="radio"/> | <input type="radio"/> | 5.13 Bulk Chemical Addition Controls |
| <input checked="" type="radio"/> | <input type="radio"/> | 5.14 Dome Loading Controls           |
| <input checked="" type="radio"/> | <input type="radio"/> | 5.15 Tank Farm Instrumentation       |
| <input checked="" type="radio"/> | <input type="radio"/> | 5.16 Corrosion Mitigation Controls   |
| <input checked="" type="radio"/> | <input type="radio"/> | 5.17 Vacuum Retrieval Controls       |

**242-A Administrative Controls (ACs):**

- | N/A                              | YES                   |  |
|----------------------------------|-----------------------|--|
| <input checked="" type="radio"/> | <input type="radio"/> | 5.6.1.1 Restriction on 242-A Pump Room and<br>Evaporator Room Access |
| <input checked="" type="radio"/> | <input type="radio"/> | 5.6.1.2 Sample Cubicle Leak Detection                                |
| <input checked="" type="radio"/> | <input type="radio"/> | 5.6.1.4 Fire Protection  |
| <input checked="" type="radio"/> | <input type="radio"/> | 5.6.1.11 242-A Evaporator Instrumentation                            |

**Comments:**

*\* need to verify parts are here/staged.  
\* route map needs to be filled out.*

**WORK RELEASE CHECKLIST FOR OE'S (continued)**  
**(For Operations Pre-Release Review)**

Work Package No.: CLO-WO-08-0564 Reviewed By: D. C. SORACE Date: 4-14-8

Title: 241-SX-113 REPLACE BREATHER FILTER WITH RADIAL FILTER

		YES	N/A
1.	Is configuration of equipment and systems properly identified for safe operation while the work is being performed?	<input checked="" type="radio"/>	<input type="radio"/>
2.	Is operability of the equipment and systems properly restored as part of the retesting? (SS/SC must address retest.) <sup>4/14/8</sup>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
3.	Are the Lock and Tag steps required to install and remove included in the work document and are the forms complete and in the WP?	<input type="radio"/>	<input checked="" type="radio"/>
4.	Are TSR, LCO, OSD, and AB requirements properly included? (Note for LCO entry/exit.)	<input type="radio"/>	<input checked="" type="radio"/>
5.	Are work scope boundaries clear and the forms complete and in the WP?	<input checked="" type="radio"/>	<input type="radio"/>

Comments:

**DOW CORNING****DOW CORNING CORPORATION  
Material Safety Data Sheet**

Page: 1 of 7

**DOW CORNING 200(R) FLUID, 100 CST.****1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY**Dow Corning Corporation  
South Saginaw Road  
Midland, Michigan 48686**24 Hour Emergency Telephone: (989) 496-5900**  
Customer Service: (989) 496-6000  
Product Disposal Information: (989) 496-6315  
CHEMTREC: (800) 424-9300

MSDS No.: 02638941

Revision Date: 2002/03/12

Generic Description: Silicone  
Physical Form: Liquid  
Color: Colorless  
Odor: Characteristic odor

NFPA Profile: Health 0 Flammability 1 Instability/Reactivity 0

Note: NFPA = National Fire Protection Association

**2. OSHA HAZARDOUS COMPONENTS**

None present. This is not a hazardous material as defined in the OSHA Hazard Communication Standard.

**3. EFFECTS OF OVEREXPOSURE**Acute EffectsEye: Direct contact may cause temporary redness and discomfort.  
Skin: No significant irritation expected from a single short-term exposure.  
Inhalation: No significant effects expected from a single short-term exposure.  
Oral: Low ingestion hazard in normal use.Prolonged/Repeated Exposure EffectsSkin: No known applicable information.  
Inhalation: No known applicable information.  
Oral: No known applicable information.Signs and Symptoms of Overexposure

No known applicable information.

Medical Conditions Aggravated by Exposure

No known applicable information.

The above listed potential effects of overexposure are based on actual data, results of studies performed upon similar compositions, component data and/or expert review of the product. Please refer to Section 11 for the detailed toxicology information.

**DOW CORNING**

**DOW CORNING CORPORATION  
Material Safety Data Sheet**

**DOW CORNING 200(R) FLUID, 100 CST.**

**4. FIRST AID MEASURES**

Eye: Immediately flush with water.  
 Skin: No first aid should be needed.  
 Inhalation: No first aid should be needed.  
 Oral: No first aid should be needed.  
 Comments: Treat symptomatically.

**5. FIRE FIGHTING MEASURES**

Flash Point: > 214 °F / > 101.1 °C (Closed Cup)  
 Autoignition Temperature: Not determined.  
 Flammability Limits in Air: Not determined.  
 Extinguishing Media: On large fires use dry chemical, foam or water spray. On small fires use carbon dioxide (CO<sub>2</sub>), dry chemical or water spray. Water can be used to cool fire exposed containers.  
 Fire Fighting Measures: Self-contained breathing apparatus and protective clothing should be worn in fighting large fires involving chemicals. Use water spray to keep fire exposed containers cool. Determine the need to evacuate or isolate the area according to your local emergency plan.  
 Unusual Fire Hazards: None.

Hazardous Decomposition Products

Thermal breakdown of this product during fire or very high heat conditions may evolve the following hazardous decomposition products: Carbon oxides and traces of incompletely burned carbon compounds. Silicon dioxide. Formaldehyde.

**6. ACCIDENTAL RELEASE MEASURES**

**DOW CORNING**

**DOW CORNING CORPORATION  
Material Safety Data Sheet**

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**DOW CORNING 200(R) FLUID, 100 CST.**

**Containment/Clean up:** Determine whether to evacuate or isolate the area according to your local emergency plan. Observe all personal protection equipment recommendations described in Sections 5 and 8. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbant. Clean area as appropriate since some silicone materials, even in small quantities, may present a slip hazard. Final cleaning may require use of steam, solvents or detergents. Dispose of saturated absorbant or cleaning materials appropriately, since spontaneous heating may occur. Local, state and federal laws and regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which federal, state and local laws and regulations are applicable. Sections 13 and 15 of this MSDS provide information regarding certain federal and state requirements.

Note: See section 8 for Personal Protective Equipment for Spills. Call Dow Corning Corporation, (989) 496-5900, if additional information is required.

**7. HANDLING AND STORAGE**

Use with adequate ventilation. Avoid eye contact.  
Use reasonable care and store away from oxidizing materials.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION**

**Component Exposure Limits**

There are no components with workplace exposure limits.

**Engineering Controls**

Local Ventilation: None should be needed.  
General Ventilation: Recommended.

**Personal Protective Equipment for Routine Handling**

Eyes: Use proper protection - safety glasses as a minimum.  
Skin: Washing at mealtime and end of shift is adequate.  
Suitable Gloves: No special protection needed.  
Inhalation: No respiratory protection should be needed.  
Suitable Respirator: None should be needed.

**Personal Protective Equipment for Spills**

Eyes: Use proper protection - safety glasses as a minimum.  
Skin: Washing at mealtime and end of shift is adequate.

**DOW CORNING**

**DOW CORNING CORPORATION  
Material Safety Data Sheet**

Page: 4 of 7

**DOW CORNING 200(R) FLUID, 100 CST.**

Inhalation/Suitable Respirator: No respiratory protection should be needed.

Precautionary Measures: Avoid eye contact. Use reasonable care.

Comments: When heated to temperatures above 150 degrees C in the presence of air, product can form formaldehyde vapors. Formaldehyde is a potential cancer hazard, a known skin and respiratory sensitizer, and an irritant to the eyes, nose, throat, skin, and digestive system. Safe handling conditions may be maintained by keeping vapor concentrations within the OSHA Permissible Exposure Limit for formaldehyde.

Note: These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Physical Form: Liquid  
 Color: Colorless  
 Odor: Characteristic odor  
 Specific Gravity @ 25°C: 0.965  
 Viscosity: 100 cSt  
 Freezing/Melting Point: Not determined.  
 Boiling Point: > 35C/95F  
 Vapor Pressure @ 25°C: Not determined.  
 Vapor Density: Not determined.  
 Solubility in Water: Not determined.  
 pH: Not determined.  
 Volatile Content: Not determined.

Note: The above information is not intended for use in preparing product specifications. Contact Dow Corning before writing specifications.

**10. STABILITY AND REACTIVITY**

Chemical Stability: Stable.  
 Hazardous Polymerization: Hazardous polymerization will not occur.  
 Conditions to Avoid: None.  
 Materials to Avoid: Oxidizing material can cause a reaction.

**11. TOXICOLOGICAL INFORMATION**

**Special Hazard Information on Components**

No known applicable information.

**12. ECOLOGICAL INFORMATION**

**Environmental Fate and Distribution**



**DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

**DOW CORNING 200(R) FLUID, 100 CST.**

**Air:** This product is a high molecular weight liquid polymer which has a very low vapour pressure (<1 mm Hg). As a result it is unlikely to become an atmospheric contaminant unless generated as an aerosol.

**Water:** This product has a very low water solubility (< 100 ppb). As it has a specific gravity of < 1, if discharged to water, it will initially form a surface film. As the product is non volatile and has a high binding affinity for particulate matter, it will adsorb to particulates and sediment out.

**Soil:** If discharged to surface water, this product will bind to sediment. If discharged in effluent to a waste water treatment plant, the product is removed from the aqueous phase by binding to sewage sludge. If the sewage sludge is subsequently spread on soil, the silicone product is expected to degrade.

**Degradation:** This product, polydimethylsiloxane, degrades in soil abiotically to form smaller molecules. These in turn are either biodegraded in soil or volatilized into the air where they are broken down in the presence of sunlight. Under appropriate conditions, the ultimate degradation products are inorganic silica, carbon dioxide and water vapour. Due to the very low water solubility of this product, standard OECD protocols for ready and inherent biodegradability are not suitable for measuring the biodegradability of this product. The product is removed >80% during the sewage treatment process.

**Environmental Effects**

**Toxicity to Water Organisms:** Based on analogy to similar materials this product is expected to exhibit low toxicity to aquatic organisms.

**Toxicity to Soil Organisms:** Experiments show that when sewage sludge containing polydimethylsiloxane is added to soil, it has no effect on soil micro-organisms, earthworms or subsequent crops grown in the soil.

**Bioaccumulation:** This product is a liquid and is a high molecular weight polymer. Due to its physical size it is unable to pass through, or be absorbed by biological membranes. This has been confirmed by testing or analogy with similar products.

**Fate and Effects in Waste Water Treatment Plants**

This product or similar products has been shown to be non-toxic to sewage sludge bacteria.

Ecotoxicity Classification Criteria

Hazard Parameters (LC50 or EC50)	High	Medium	Low
Acute Aquatic Toxicity (mg/L)	<=1	>1 and <=100	>100
Acute Terrestrial Toxicity	<=100	>100 and <= 2000	>2000

This table is adapted from "Environmental Toxicology and Risk Assessment", ASTM STP 1179, p.34, 1993.

This table can be used to classify the ecotoxicity of this product when ecotoxicity data is listed above. Please read the other information presented in the section concerning the overall ecological safety of this material.

**13. DISPOSAL CONSIDERATIONS**

**RCRA Hazard Class (40 CFR 261)**

**DOW CORNING****DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 6 of 7

**DOW CORNING 200(R) FLUID, 100 CST.**

When a decision is made to discard this material, as received, is it classified as a hazardous waste? No

State or local laws may impose additional regulatory requirements regarding disposal.

Call Dow Corning Corporate Environmental Management, (989) 496-6315, if additional information is required.

**14. TRANSPORT INFORMATION****DOT Road Shipment Information (49 CFR 172.101)****Ocean Shipment (IMDG)**

Not subject to IMDG code.

**Air Shipment (IATA)**

Not subject to IATA regulations.

Call Dow Corning Transportation, (989) 496-8577, if additional information is required.

**15. REGULATORY INFORMATION**

Contents of this MSDS comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA Status: All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.

**EPA SARA Title III Chemical Listings****Section 302 Extremely Hazardous Substances:**

None.

**Section 304 CERCLA Hazardous Substances:**

None.

**Section 312 Hazard Class:**

Acute: No  
Chronic: No  
Fire: No  
Pressure: No  
Reactive: No

**Section 313 Toxic Chemicals:**

None present or none present in regulated quantities.

**Supplemental State Compliance Information**

California

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**DOW CORNING**

**DOW CORNING CORPORATION  
Material Safety Data Sheet**

Page: 7 of 7

**DOW CORNING 200(R) FLUID, 100 CST.**

Warning: This product contains the following chemical(s) listed by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as being known to cause cancer, birth defects or other reproductive harm.

None known.

**Massachusetts**

No ingredient regulated by MA Right-to-Know Law present.

**New Jersey**

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
63148-62-9	> 60.0	Polydimethylsiloxane

**Pennsylvania**

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
63148-62-9	> 60.0	Polydimethylsiloxane

**16. OTHER INFORMATION**

Prepared by: Dow Corning Corporation

These data are offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

(R) indicates Registered Trademark

# MATERIAL SAFETY DATA SHEET: SIMPLE GREEN®

also for : SIMPLE GREEN® SCRUBBING PAD

## I. PRODUCT & COMPANY INFORMATION

Version No. 10012  
Issue Date: January 2006

PRODUCT NAME: SIMPLE GREEN® ALL-PURPOSE CLEANER  
SIMPLE GREEN® CONCENTRATED CLEANER / DEGREASER / DEODORIZER  
SIMPLE GREEN® SCRUBBING PAD

Page 1 of 4

COMPANY NAME: SUNSHINE MAKERS, INC.  
15922 Pacific Coast Highway  
Huntington Harbour, CA 92649 USA  
Telephone: 800-228-0709 • 562-795-6000  
Fax: 562-592-3034  
Website: www.simplegreen.com

MSDS # 012261

For 24-hour emergency, call Chem-Tel, Inc.: 800-255-3924

USE OF PRODUCT: An all purpose cleaner and degreaser used diluted in water for direct, spray, and dip tank procedures. (Scrubbing pad is used with water for manual scrubbing applications.)

## II. INGREDIENT INFORMATION

The only ingredient of Simple Green® with established exposure limits is undiluted 2-butoxyethanol (<6%) (Butyl Cellosolve; CAS No. 111-76-2); the ACGIH TLV-TWA is 20 ppm (97 mg/m<sup>3</sup>).

Based upon chemical analysis, Simple Green® contains no known EPA priority pollutants, heavy metals, or chemicals listed under RCRA, CERCLA, or CWA. Analysis by TCLP (Toxicity Characteristic Leaching Procedure) according to RCRA revealed no toxic organic or inorganic constituents.

All components of Simple Green® are listed on the TSCA Chemical Substance Inventory.

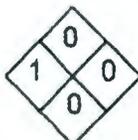
## III. HAZARDS IDENTIFICATION

UN Number: Not required  
Dangerous Goods Class: Nonhazardous

NJ TRADE SECRET REGISTRATION NUMBERS	
80100235-5000p	80100235-5005p
80100235-5001p	80100235-5006p
80100235-5002p	80100235-5007p
80100235-5003p	80100235-5008p
80100235-5004p	80100235-5009p

### Hazard Rating (NFPA/HMIS)

Health = 1\*      Reactivity = 0  
Fire = 0          Special = 0



### Rating Scale

0 = minimal      1 = slight  
2 = moderate     3 = serious  
4 = severe

\*Mild eye irritant, non-mutagenic and non-carcinogenic. None of the ingredients in Simple Green® are regulated or listed as cancer agents by Federal OSHA, NTP, or IARC.

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**IV. FIRST AID MEASURES****SYMPTOMS OF OVEREXPOSURE AND FIRST AID TREATMENT**

- Eye contact:** Reddening may develop. Immediately rinse the eye with large quantities of cool water; continue 10-15 minutes or until the material has been removed; be sure to remove contact lenses, if present, and to lift upper and lower lids during rinsing. Get medical attention if irritation persists.
- Skin contact:** Minimal effects, if any; rinse skin with water, rinse shoes and launder clothing before reuse. Reversible reddening may occur in some dermal-sensitive users; thoroughly rinse area and get medical attention if reaction persists.
- Swallowing:** Essentially non-toxic. Give several glasses of water to dilute; do not induce vomiting. If stomach upset occurs, consult physician.
- Inhalation:** Non-toxic. Exposures to concentrate-mist may cause mild irritation of nasal passages or throat; remove to fresh air. Get medical attention if irritation persists.

**V. FIRE FIGHTING MEASURES**

Simple Green® is stable, not flammable, and will not burn.

- |                                   |   |                      |
|-----------------------------------|---|----------------------|
| Flash Point/Auto-Ignition:        | Not flammable.  | <b>MSDS # 012261</b> |
| Flammability Limits:              | Not flammable.  |                      |
| Extinguishing Media:              | Not flammable/nonexplosive. No special procedures required. |                      |
| Special Fire Fighting Procedures: | None required.  |                      |

**VI. ACCIDENTAL RELEASE MEASURES**

Recover usable material by convenient method; residual may be removed by wipe or wet mop. If necessary, unrecoverable material may be washed to drain with large quantities of water.

**VII. HANDLING, STORAGE & TRANSPORT INFORMATION**

No special precautions are required. This product is non-hazardous for storage and transport according to the U.S. Department of Transportation Regulations. Simple Green® requires no special labeling or placarding to meet U.S. Department of Transportation requirements.

UN Number: Not required

Dangerous Goods Class: Non-hazardous

**VIII. EXPOSURE CONTROLS**

**Exposure Limits:** The Simple Green® formulation presents no health hazards to the user when used according to label directions for its intended purposes. Mild skin and eye irritation is possible (please see Eye contact and Skin contact in Section IV.).

**Ventilation:** No special ventilation is required during use.

**Human Health Effects or Risks from Exposure:** Adverse effects on human health are not expected from Simple Green®, based upon twenty years of use without reported adverse health incidence in diverse population groups, including extensive use by inmates of U.S. Federal prisons in cleaning operations.

Simple Green® is a mild eye irritant; mucous membranes may become irritated by concentrate-mist.

Simple Green® is not likely to irritate the skin in the majority of users. Repeated daily application to the skin without rinsing, or continuous contact of Simple Green® on the skin may lead to temporary, but reversible, irritation.

**Medical Conditions Aggravated by Exposure:** No aggravation of existing medical conditions is expected; dermal sensitive users may react to dermal contact by Simple Green®.

**IX. PERSONAL PROTECTION**

<b>Precautionary Measures:</b>	No special requirements under normal use conditions.
<b>Eye Protection:</b>	<b>Caution, including reasonable eye protection, should always be used to avoid eye contact where splashing may occur.</b>
<b>Skin Protection:</b>	No special precautions required; rinse completely from skin after contact.
<b>Respiratory Protection:</b>	No special precautions required.
<b>Work and Hygienic Practices:</b>	No special requirements. Wash or rinse hands before touching eyes or contact lenses.

**X. PHYSICAL AND CHEMICAL PROPERTIES**

<b>Appearance/odor:</b>	Translucent green liquid with characteristic sassafras odor. (Scrubber is green fibrous rectangle.)		
<b>Specific Gravity:</b>	1.0257	<b>Vapor Pressure:</b>	17 mm Hg @ 20 °C; 22 mm Hg @ 25 °C
<b>pH of concentrate:</b>	9.5	<b>Vapor Density:</b>	1.3 (air = 1)
<b>Evaporation:</b>	>1 (butyl acetate = 1)	<b>Density:</b>	8.5 lbs./gallon
<b>Boiling Point:</b>	110 °C (231 °F)		
<b>Freezing Point:</b>	-9 °C (16 °F) If product freezes, it will reconstitute without loss of efficacy when brought back to room temperature and agitated.		

**VOC Composite Partial Pressure:** 0.006 mm Hg @ 20 °C

**Volatile Organic Compounds (VOCs):** 7.96 g/L per ASTM Method 3960-90. Per EPA Method 24, VOCs are 5.9% and product must be diluted at least 1 part of water to 1 part Simple Green® in order to meet CARB 2005 VOC regulations -or 1 part Simple Green to 3 parts water to meet SCAQMD Rule 1171 & Rule 1122 and BAAQMD Regulation 8-16 VOC requirements for solvent cleaning operations.

**Water Solubility:** Completely soluble in water. The higher salt concentrations in marine ecosystems will lead to complexes with Simple Green® that may become visible at ratios above one part Simple Green® to 99 parts seawater.

**Ash Content:** At 600 °F: 1.86% by weight.

**Nutrient Content:** Nitrogen: <1.0% by weight (fusion and qualitative test for ammonia).  
Phosphorus: 0.3% by formula.  
Sulfur: 0.6% by weight (barium chloride precipitation method).

**Detection:** Simple Green® has a characteristic sassafras odor that is not indicative of any hazardous situation.

**XI. STABILITY AND REACTIVITY INFORMATION**

Nonreactive. Simple Green® is stable, even under fire conditions, and will not react with water or oxidizers. Hazardous polymerization will not occur.

**XII. TOXICOLOGICAL INFORMATION****Nonhuman Toxicity****Acute Mortality Studies:**

Oral LD<sub>50</sub> (rat): >5.0 g/kg body weight // Dermal LD<sub>50</sub> (rabbit): >2.0 g/kg body weight

**Dermal Irritation:** Only mild, but reversible, irritation was found in a standard 72-hr test on rabbits. A value of 0.2 (non-irritating) was found on a scale of 8.

**Eye Irritation:** With or without rinsing with water, the irritation scores in rabbits at 24 hours did not exceed 15 (mild irritant) on a scale of 110.

**Subchronic dermal effects:** No adverse effects, except reversible dermal irritation, were found in rabbits exposed to Simple Green® (up to 2.0 g/kg/day for 13 weeks) applied to the skin of 25 males and 25 females. Only female body weight gain was affected. Detailed microscopic examination of all major tissues showed no adverse changes.

**Fertility Assessment by Continuous Breeding:** The Simple Green® formulation had no adverse effect on fertility and reproduction in CD-1 mice with continuous administration for 18 weeks, and had no adverse effect on the reproductive performance of their offspring.

### XIII. BIODEGRADABILITY AND ENVIRONMENTAL TOXICITY INFORMATION

#### Biodegradability:

Simple Green® is readily decomposed by naturally occurring microorganisms. The biological oxygen demand (BOD), as a percentage of the chemical oxygen demand (COD), after 4, 7, and 11 days was 56%, 60%, and 70%, respectively. Per OECD Closed Bottle Test, Simple Green® meets OECD and EPA recommendations for ready biodegradability. In a standard biodegradation test with soils from three different countries, Butyl Cellosolve reached 50% degradation in 6 to 23 days, depending upon soil type, and exceeded the rate of degradation for glucose which was used as a control for comparison.

#### Environmental Toxicity Information:

Simple Green® is considered practically non-toxic per EPA's aquatic toxicity scale. Simple Green® is non-lethal to any of the marine and estuarine test animals listed in the following table at concentrations below 200 mg/L (0.02%). This table shows the Simple Green® concentrations that are likely to be lethal to 50% of the exposed organisms.

	LC <sub>50</sub> in mg/L (ppm)	
	48-hour	96-hour
<u>Marine Fish:</u>		
Mud minnow ( <i>Fundulus heteroclitus</i> )	1690	1574
Whitebait ( <i>Galaxias maculatus</i> )	210	210
<u>Marine/Estuarine Invertebrates:</u>		
Brine Shrimp ( <i>Artemia salina</i> )	610	399
Grass Shrimp ( <i>Palaemonetes pugio</i> )	270	220
Green-lipped Mussel ( <i>Perna canaliculus</i> )	220	220
Mud Snail ( <i>Potamopyrgus estuarinus</i> )	410	350

MSDS # 012261

### XIV. DISPOSAL CONSIDERATIONS

Simple Green® is fully water soluble and biodegradable and will not harm sewage-treatment microorganisms if disposal by sewer or drain is necessary. Dispose of in accordance with all applicable local, state, and federal laws.

### XV. OTHER INFORMATION

Containers: Simple Green® residues can be completely removed by rinsing with water; the container may be recycled or applied to other uses.

Electrical Wiring Compatibility: Polyimide insulated wiring is not affected by exposure to Simple Green®. After immersion in Simple Green® for 14 days at 74°F, the 61 cm piece of polyamide insulated wire passed a one minute dielectric proof test at 2500 volts (ASTM D-149).

Contact Point: Sunshine Makers, Inc., Research and Development Division: 562-795-6000.

National Stock Numbers:

PART#	NSN	SIZE	PART#	NSN	SIZE
13012	7930-01-342-5315	24 oz. spray (12/cs)	13016	7930-01-342-5317	15 gal.
13005	7930-01-308-8369	1 gal. (6/cs)	13008	7930-01-342-4145	55 gal.
13006	7930-01-342-5318	5 gal.	Scrubbing Pad 10224	7930-01-346-9148	Each (24/cs)

#### \*\*\* NOTICE \*\*\*

All information appearing herein is based upon data obtained by the manufacturer & recognized technical sources. Judgments as to the suitability of information herein for purchaser's purposes are necessarily purchaser's responsibility. Therefore, although reasonable care has been taken in the preparation of this information, Sunshine Makers, Inc. or its distributors extends no warranties, makes no representations and assumes no responsibility as to the suitability of such information for application to purchaser's intended purposes or for consequences of its use.

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MSDS " 012664B  
**WD-40**



## MATERIAL SAFETY DATA SHEET

### I. PRODUCT IDENTIFICATION

Manufacturer:	WD-40 Company	Telephone:	
Address:	1061 Cudahy Place (92110) P.O. Box 80607 San Diego, California 92138-0607	Emergency only:	1-(800) 424-9300 (CHEMTREC)
		Information:	(619) 275-1400
		Chemical Name:	Organic Mixture
		Trade Name:	WD-40 Aerosol

### II. HAZARDOUS INGREDIENTS

Chemical Name	CAS Number	%	Exposure Limit ACGIH/OSHA
Aliphatic Petroleum Distillates	8052-41-3	45-50	100 ppm PEL
Petroleum Base Oil	64742-65-0	15-25	5 mg/M <sup>3</sup> TWA (mist)
LVP Hydrocarbon Fluid	64742-47-8	12-18	1200 mg/M <sup>3</sup> TWA
Carbon Dioxide	124-38-9	2-3	5000 ppm PEL
Non-hazardous Ingredients		< 10	

### III. PHYSICAL DATA

Boiling Point:	323°F (minimum)	Evaporation Rate:	Not determined
Vapor Density (air=1):	Greater than 1	Vapor Pressure:	110 ±5 PSI @ 70°F
Solubility in Water:	insoluble	Appearance:	Light amber
Specific Gravity (H <sub>2</sub> O=1):	0.817 @ 72°F	Odor:	Characteristic odor
Percent Volatile (volume):	74%	VOC:	412 grams/liter (49.5%)

### IV. FIRE AND EXPLOSION

Flash Point:	131°F Tag Closed Cup
Flammable Limits:	(Solvent Portion) [Le] 1.0% [Uel] 6.0%
Extinguishing Media:	CO <sub>2</sub> , Dry Chemical, Foam.
Special Fire Fighting Procedures:	Contents Under Pressure
Unusual Fire and Explosion Hazards:	FLAMMABLE - U.F.C. level 3 AEROSOL

### V. HEALTH HAZARD / ROUTE(S) OF ENTRY

<b>Threshold Limit Value</b>	Aliphatic Petroleum Distillates (Stoddard Solvent) lowest TLV (ACGIH 100 ppm.)
<b>Symptoms of Overexposure</b>	
<b>Inhalation (Breathing):</b>	May cause anesthesia, headache, dizziness, nausea and upper respiratory irritation.
<b>Skin contact:</b>	May cause drying of skin and/or irritation.
<b>Eye contact:</b>	May cause irritation, tearing and redness.
<b>Ingestion (Swallowed):</b>	May caused irritation, nausea, vomiting and diarrhea.
<b>First Aid Emergency Procedures</b>	
<b>Ingestion (Swallowed):</b>	Do not induce vomiting, seek medical attention.
<b>Eye Contact:</b>	Immediately flush eyes with large amounts of water for 15 minutes.
<b>Skin Contact:</b>	Wash with soap and water.
<b>Inhalation (Breathing):</b>	Remove to fresh air. Give artificial respiration if necessary. If breathing is difficult, give oxygen.
	Pre-existing medical conditions such as eye, skin and respiratory disorders may be aggravated by exposure.
<b>DANGER!</b>	
<b>Aspiration Hazard:</b>	If swallowed, can enter lungs and may cause chemical pneumonitis. Do not induce vomiting. Call Physician immediately.
<b>Suspected Cancer Agent</b>	The components in this mixture have been found to be noncarcinogenic by NTP, IARC and OSHA
Yes ___ No <u>X</u>	

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**VI. REACTIVITY DATA**

Stability:	Stable <u>X</u>	Unstable _____
Conditions to avoid:	NA	
Incompatibility:	Strong oxidizing agents	
Hazardous decomposition products:	Thermal decomposition may yield carbon monoxide and/or carbon dioxide.	
Hazardous polymerization:	May occur _____	Will not occur <u>X</u>

**VII. SPILL OR LEAK PROCEDURES**

<b>Spill Response Procedures</b>	
Spill unlikely from aerosol cans. Leaking cans should be placed in plastic bag or open pail until pressure has dissipated.	
<b>Waste Disposal Method</b>	
Empty aerosol cans should not be punctured or incinerated; bury in land fill. Liquid should be incinerated or buried in land fill. Dispose of in accordance with local, state and federal regulations.	

**VIII. SPECIAL HANDLING INFORMATION**

Ventilation:	Sufficient to keep solvent vapor less than TLV.
Respiratory Protection:	Advised when concentrations exceed TLV.
Protective Gloves:	Advised to prevent possible skin irritation.
Eye Protection:	Approved eye protections to safeguard against potential eye contact, irritation or injury.
Other Protective Equipment:	None required.

**IX. SPECIAL PRECAUTIONS**

Keep from sources of ignition. Avoid excessive inhalation of spray particles, do not take internally. Do not puncture, incinerate or store container above 120°F. Exposure to heat may cause bursting. Keep can away from electrical current or battery terminals. Electrical arcing can cause burn-through (puncture) which may result in flash fire, causing serious injury. Keep from children.

**X. TRANSPORTATION DATA (49 CFR 172.101)**

<b>Domestic Surface</b>	
Description:	Consumer Commodity
Hazard Class:	ORM-D
ID No:	None
Label Required:	Consumer commodity (ORM-D)

**XI. REGULATORY INFORMATION**

All ingredients for this product are listed on the TSCA inventory.	
SARA Title III chemicals:	None
California Prop 65 chemicals:	None
CERCLA reportable quantity:	None
RCRA hazardous waste no:	D001 (Ignitable)

SIGNATURE: Peter Fougner  TITLE: Director of Global Quality Assurance

REVISION DATE: December, 2004 SUPERSEDES: November, 2003

NA: Not applicable    NDA: No data available    ( = Less than    ) = More than

We believe the statements, technical information and recommendations contained herein are reliable. However, the data is provided without warranty, expressed or implied. It is the user's responsibility both to determine safe conditions for use of this product and assume loss, damage or expense, direct or consequential, arising from its use. Before using product, read label.

KANO LABORATORIES, INC.  
SAFETY DATA SHEET

## SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

**Manufacturer:** Kano Laboratories, Inc.  
1000 E. Thompson Lane  
Nashville, TN 37211  
**Information Phone Number:** (615) 833-4101  
**Fax:** (615) 833-5790 **Emergency:** 800-424-9300 (Chemtrec)  
**Website:** www.kanolaboratories.com

## HMIS Hazard Rating

<input checked="" type="checkbox"/>	HEALTH	1
<input checked="" type="checkbox"/>	FLAMMABILITY	2
<input type="checkbox"/>	REACTIVITY	0
<input type="checkbox"/>	PERSONAL PROTECTION	X

**Product Name:** KROIL  
**MSDS Date of Preparation:** 6/7/05  
**Product Use:** Penetrant/Lubricant for Industrial Use

## SECTION 2: HAZARDS IDENTIFICATION

Slightly reddish liquid with a refreshing odor.

## EMERGENCY OVERVIEW

**WARNING!** Combustible Liquid and Vapor. May cause eye and skin irritation. May be harmful if absorbed through the skin. Inhalation of vapors or mist may cause respiratory irritation and central nervous system effects such as headache, dizziness, nausea and vomiting. Harmful or fatal if swallowed. Aspiration into the lungs during ingestion or vomiting may cause lung damage. May cause chronic effects.

**Potential Health Effects:**

**Eye:** May cause eye irritation with redness, tearing and stinging. Corneal injury is possible if not promptly removed.

**Skin:** May cause mild irritation with redness, rash, swelling. Prolonged or repeated contact may result in defatting and dermatitis. May be absorbed through the skin with effects similar to inhalation and ingestion.

**Inhalation:** Inhalation of vapors or mists may cause mucous membrane and upper respiratory tract irritation and central nervous system depression. Symptoms may include burning sensation, coughing, wheezing, sore throat, shortness of breath, headache, dizziness, drowsiness, nausea, vomiting, depressed respiration and heart rate, heart rhythm irregularities and unconsciousness.

**Ingestion:** Swallowing may cause gastrointestinal irritation with abdominal pain, nausea, vomiting and diarrhea and central nervous system depression with symptoms including headache, dizziness, intoxication, weakness, respiratory failure, convulsions, cardiovascular collapse and pulmonary edema. Aspiration into the lungs during ingestion or vomiting may cause lung damage.

**Chronic Hazards:** Prolonged or repeated exposure may cause damage to the central nervous system, blood, kidney and liver. This product contains chemicals that in animal studies caused harm to the developing fetus, but only at exposure levels that harm the pregnant animal. There is no evidence of adverse fetal or reproductive effects in humans.

**Carcinogen Status:** None of the components of this product at greater than 0.1% are listed as carcinogens by OSHA, IARC or NTP.

**Medical Conditions Aggravated by Exposure:** Pre-existing eye, skin, respiratory, heart, central nervous system, liver and kidney disorders.

**SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS**

Chemical Name	CAS#	%
Severely Hydrotreated Petroleum Distillates	64742-52-5	30-50
Light Petroleum Distillates	64742-95-6/64742-88-7/64742-47-8	30-50
Aliphatic Alcohols	78-92-2/123-42-2	1-5
Glycol Ether	111-76-2	1-5
Proprietary Ingredients	Proprietary	5-15

**SECTION 4: FIRST AID MEASURES**

**Eye:** Rinse thoroughly with water for at least 15 minutes, holding the eye lids open to be sure the material is washed out. Get immediate medical attention.

**Skin:** Remove contaminated clothing. Wash contact area thoroughly with soap and water. Get medical attention if irritation or symptoms of exposure develop. Launder clothing before re-use.

**Inhalation:** Remove victim to fresh air. Give artificial respiration if needed. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

**Ingestion:** DO NOT induce vomiting. Keep the victim calm and warm. Never give anything by mouth to an unconscious or drowsy person. Get immediate medical attention.

**SECTION 5: FIRE FIGHTING MEASURES**

**Flash Point:** 124°F (51°C) COC

**Flammable Limits:** LEL: 0.9%  
UEL: 10.6%

**Autoignition Temperature:** Not Determined

**Extinguishing Media:** Use carbon dioxide, dry chemical or foam. Water may be ineffective but can be used to cool containers and structures.

**Special Fire Fighting Procedures:** Wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing. Cool fire exposed containers with water.

**Unusual Fire Hazards:** Vapors are heavier than air and may travel along surfaces to remote ignition sources and flash back. Never use welding or cutting torch on or near containers (even empty) because product can ignite explosively. Combustion products may be hazardous.

**Hazardous Decomposition Products:** Oxides of carbon, organic compounds, smoke and fumes.

**SECTION 6: ACCIDENTAL RELEASE MEASURES**

**Spill:** Remove all ignition sources such as open flames, spark producing equipment, pilot lights, etc. Wear appropriate protective clothing to prevent eye and skin contact including impervious gloves, safety goggles and respirator if needed (refer to Section 8 for specific recommendations). Ventilate area. Cover with an inert absorbent material and collect into an appropriate container for disposal. Report spills and releases as required to appropriate authorities.

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**SECTION 7: HANDLING AND STORAGE**

**Handling:** Avoid breathing vapors, aerosols and mists. Use with adequate ventilation. Avoid contact with the eyes, skin and clothing. Wash exposed skin thoroughly with soap and water after use. Keep product away from heat, sparks, flames and all other sources of ignition. No smoking in storage or use areas. Keep containers closed when not in use. Do not cut, braze, solder, grind or weld empty containers. Do not reuse containers. Follow all MSDS precautions in handling empty containers.

**Storage:** Store in a cool, dry, well-ventilated location away from incompatible materials. Keep containers closed

**SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

Chemical Name	Exposure Limits
Severely Hydrotreated Petroleum Distillates	5 mg/m <sup>3</sup> OSHA PEL-TWA 5 mg/m <sup>3</sup> ACGIH TLV-TWA 10 mg/m <sup>3</sup> ACGIH TLV-STEL
Light Petroleum Distillates	100 ppm OSHA PEL-TWA 100 ppm ACGIH TLV-TWA
Aliphatic Alcohol	150 ppm OSHA PEL-TWA 100 ppm ACGIH TLV-TWA
Aliphatic Alcohol	50 ppm OSHA PEL-TWA 50 ppm ACGIH TLV-TWA
Glycol Ether	50 ppm OSHA PEL-TWA 20 ppm ACGIH TLV-TWA
Proprietary Ingredients	None Established

**Ventilation:** Use with adequate general or local exhaust ventilation to maintain concentrations below the occupational exposure limits. Use explosion proof electrical equipment and wiring where required.

**Respiratory Protection:** If needed, a NIOSH approved respirator with organic vapor cartridges may be used. For higher exposures, a supplied air respirator may be required. Respirator selection and use should be based on contaminant type, form and concentration. Follow OSHA 1910.134, ANSI Z88.2 and good Industrial Hygiene practice.

**Skin Protection** Impervious gloves are recommended when needed to avoid skin contact. Based on available test data, 4H or Silver Shield gloves are suggested.

**Eye Protection:** Chemical safety goggles recommended.

**Other Protective Equipment:** Impervious clothing as required to prevent skin contact and contamination of personal clothing. Suitable eye wash and washing facilities should be available in the work area.

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance and Odor:** Slightly reddish liquid with a refreshing odor.

**pH:** 6-7

**Boiling Point:** 258°F

**Vapor Pressure:** 12 mm Hg @ 20°C (aliphatic alcohol)

**Vapor Density (air =1):** Greater than 1

**Specific Gravity:** 0.87

**Melting Point:** Not applicable

**Water Solubility:** Negligible

**Evaporation Rate (ether=1):** Less than 1

**SECTION 10: STABILITY AND REACTIVITY**

**Stability:** Stable under normal conditions of storage or use.

**Incompatibility/Conditions to Avoid:** Avoid strong oxidizing agents, reducing agents, acids, bases, amines, alkanolamines, ammonia, chlorinated compounds. Avoid heat, sparks, flames and all other sources of ignition.

**Hazardous Decomposition Products:** Combustion will produce oxides of carbon, organic compounds, smoke and fumes.

**Hazardous Polymerization:** Will not occur.

**SECTION 11: TOXICOLOGICAL INFORMATION**

Toxicological testing has not been performed on this product as a mixture.

The calculated acute toxicity values, as determined by the DOT and other agency standard formula are: Oral LD50 = 2270; Dermal LD50 = 1500 mg/kg. Kroil is not classified as toxic under workplace or transportation criteria.

**SECTION 12: ECOLOGICAL INFORMATION**

No data available.

**SECTION 13: DISPOSAL INFORMATION**

Dispose in accordance with all local, state and federal regulations.

**SECTION 14: TRANSPORT INFORMATION**

**DOT Shipping Name:** Exempted from Hazmat when packaged in non-bulk containers (<119 gal) and shipped ground  
**DOT Hazard Class/Packing Group:** None  
**UN Number:** None  
**DOT Labels Required (49CFR172.101):** None  
**Hazardous Substance (49CFR172.101):** None  
**Reportable Quantity:** None

**DOT Marine Pollutants:** This product does not contain marine pollutants as defined in 49CFR 171.8.

**IATA Shipping Name:** Flammable liquid, n.o.s. (Aliphatic Alcohols, Petroleum Distillates)  
**IATA Hazard Class/Packing Group:** 3, III  
**UN Number:** UN1993  
**IATA Hazard Labels Required:** Class 3

**SECTION 15: REGULATORY INFORMATION**

**U.S. FEDERAL REGULATIONS:**

**CERCLA 103 Reportable Quantity:** This product is not subject to CERCLA reporting requirements, however, oil spills are reportable to the National Response Center under the Clean Water Act and many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

MSDS # 014258

KROIL  
6/7/05

**SARA TITLE III:**

**Hazard Category for Section 311/312:** Acute Health, Chronic Health, Fire Hazard

**Section 313 Toxic Chemicals:** This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirements:

Aliphatic Alcohol	78-92-2	1-5%
Glycol Ether	111-76-2	1-5%
1,2,4-Trimethylbenzene	95-63-6	.5 - < 5%

**Section 302 Extremely Hazardous Substances (TPQ):** None

**EPA Toxic Substances Control Act (TSCA) Status:** All of the components of this product are listed on the TSCA inventory.

**SECTION 16: OTHER INFORMATION**

**HMIS Ratings:** Health - 1      Flammability - 2      Reactivity - 0  
**NFPA Ratings:** Health - 1      Flammability - 2      Reactivity - 0

=====  
The information contained herein has been developed based upon current available scientific data. New information may be developed from time to time which may render the conclusions of this report obsolete. Therefore, no warranty is extended as to the applicability of this information to the user's intended purpose or the consequences of its use or misuse.

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KANO LABORATORIES, INC.  
SAFETY DATA SHEET

## SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

**Manufacturer:** Kano Laboratories, Inc.  
1000 E. Thompson Lane  
Nashville, TN 37211  
**Information Phone Number:** (615) 833-4101  
**Fax:** (615) 833-5790 **Emergency:** 800-424-9300 (Chemtrec)  
**Website:** www.kanolaboratories.com

## HMIS Hazard Rating

<input checked="" type="checkbox"/>	HEALTH	1
<input checked="" type="checkbox"/>	FLAMMABILITY	2
<input type="checkbox"/>	REACTIVITY	0
<input type="checkbox"/>	PERSONAL PROTECTION	X

**Product Name:** KROIL  
**MSDS Date of Preparation:** 6/7/05  
**Product Use:** Penetrant/Lubricant for Industrial Use

## SECTION 2: HAZARDS IDENTIFICATION

Slightly reddish liquid with a refreshing odor.

## EMERGENCY OVERVIEW

**WARNING!** Combustible Liquid and Vapor. May cause eye and skin irritation. May be harmful if absorbed through the skin. Inhalation of vapors or mist may cause respiratory irritation and central nervous system effects such as headache, dizziness, nausea and vomiting. Harmful or fatal if swallowed. Aspiration into the lungs during ingestion or vomiting may cause lung damage. May cause chronic effects.

**Potential Health Effects:**

**Eye:** May cause eye irritation with redness, tearing and stinging. Corneal injury is possible if not promptly removed.

**Skin:** May cause mild irritation with redness, rash, swelling. Prolonged or repeated contact may result in defatting and dermatitis. May be absorbed through the skin with effects similar to inhalation and ingestion.

**Inhalation:** Inhalation of vapors or mists may cause mucous membrane and upper respiratory tract irritation and central nervous system depression. Symptoms may include burning sensation, coughing, wheezing, sore throat, shortness of breath, headache, dizziness, drowsiness, nausea, vomiting, depressed respiration and heart rate, heart rhythm irregularities and unconsciousness.

**Ingestion:** Swallowing may cause gastrointestinal irritation with abdominal pain, nausea, vomiting and diarrhea and central nervous system depression with symptoms including headache, dizziness, intoxication, weakness, respiratory failure, convulsions, cardiovascular collapse and pulmonary edema. Aspiration into the lungs during ingestion or vomiting may cause lung damage.

**Chronic Hazards:** Prolonged or repeated exposure may cause damage to the central nervous system, blood, kidney and liver. This product contains chemicals that in animal studies caused harm to the developing fetus, but only at exposure levels that harm the pregnant animal. There is no evidence of adverse fetal or reproductive effects in humans.

**Carcinogen Status:** None of the components of this product at greater than 0.1% are listed as carcinogens by OSHA, IARC or NTP.

**Medical Conditions Aggravated by Exposure:** Pre-existing eye, skin, respiratory, heart, central nervous system, liver and kidney disorders.

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS#	%
Severely Hydrotreated Petroleum Distillates	64742-52-5	30-50
Light Petroleum Distillates	64742-95-6/64742-88-7/64742-47-8	30-50
Aliphatic Alcohols	78-92-2/123-42-2	1-5
Glycol Ether	111-76-2	1-5
Proprietary Ingredients	Proprietary	5-15

## SECTION 4: FIRST AID MEASURES

**Eye:** Rinse thoroughly with water for at least 15 minutes, holding the eye lids open to be sure the material is washed out. Get immediate medical attention.

**Skin:** Remove contaminated clothing. Wash contact area thoroughly with soap and water. Get medical attention if irritation or symptoms of exposure develop. Launder clothing before re-use.

**Inhalation:** Remove victim to fresh air. Give artificial respiration if needed. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

**Ingestion:** DO NOT induce vomiting. Keep the victim calm and warm. Never give anything by mouth to an unconscious or drowsy person. Get immediate medical attention.

## SECTION 5: FIRE FIGHTING MEASURES

**Flash Point:** 124°F (51°C) COC

**Flammable Limits:** LEL: 0.9%  
UEL: 10.6%

**Autoignition Temperature:** Not Determined

**Extinguishing Media:** Use carbon dioxide, dry chemical or foam. Water may be ineffective but can be used to cool containers and structures.

**Special Fire Fighting Procedures:** Wear NIOSH approved, positive pressure, self-contained breathing apparatus and full protective clothing. Cool fire exposed containers with water.

**Unusual Fire Hazards:** Vapors are heavier than air and may travel along surfaces to remote ignition sources and flash back. Never use welding or cutting torch on or near containers (even empty) because product can ignite explosively. Combustion products may be hazardous.

**Hazardous Decomposition Products:** Oxides of carbon, organic compounds, smoke and fumes.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

**Spill:** Remove all ignition sources such as open flames, spark producing equipment, pilot lights, etc. Wear appropriate protective clothing to prevent eye and skin contact including impervious gloves, safety goggles and respirator if needed (refer to Section 8 for specific recommendations). Ventilate area. Cover with an inert absorbent material and collect into an appropriate container for disposal. Report spills and releases as required to appropriate authorities.

**SECTION 7: HANDLING AND STORAGE**

**Handling:** Avoid breathing vapors, aerosols and mists. Use with adequate ventilation. Avoid contact with the eyes, skin and clothing. Wash exposed skin thoroughly with soap and water after use. Keep product away from heat, sparks, flames and all other sources of ignition. No smoking in storage or use areas. Keep containers closed when not in use. Do not cut, braze, solder, grind or weld empty containers. Do not reuse containers. Follow all MSDS precautions in handling empty containers.

**Storage:** Store in a cool, dry, well-ventilated location away from incompatible materials. Keep containers closed.

**SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

Chemical Name	Exposure Limits
Severely Hydrotreated Petroleum Distillates	5 mg/m <sup>3</sup> OSHA PEL-TWA 5 mg/m <sup>3</sup> ACGIH TLV-TWA 10 mg/m <sup>3</sup> ACGIH TLV-STEL
Light Petroleum Distillates	100 ppm OSHA PEL-TWA 100 ppm ACGIH TLV-TWA
Aliphatic Alcohol	150 ppm OSHA PEL-TWA 100 ppm ACGIH TLV-TWA
Aliphatic Alcohol	50 ppm OSHA PEL-TWA 50 ppm ACGIH TLV-TWA
Glycol Ether	50 ppm OSHA PEL-TWA 20 ppm ACGIH TLV-TWA
Proprietary Ingredients	None Established

**Ventilation:** Use with adequate general or local exhaust ventilation to maintain concentrations below the occupational exposure limits. Use explosion proof electrical equipment and wiring where required.

**Respiratory Protection:** If needed, a NIOSH approved respirator with organic vapor cartridges may be used. For higher exposures, a supplied air respirator may be required. Respirator selection and use should be based on contaminant type, form and concentration. Follow OSHA 1910.134, ANSI Z88.2 and good Industrial Hygiene practice.

**Skin Protection:** Impervious gloves are recommended when needed to avoid skin contact. Based on available test data, 4H or Silver Shield gloves are suggested.

**Eye Protection:** Chemical safety goggles recommended.

**Other Protective Equipment:** Impervious clothing as required to prevent skin contact and contamination of personal clothing. Suitable eye wash and washing facilities should be available in the work area.

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance and Odor:** Slightly reddish liquid with a refreshing odor.

**pH:** 6-7

**Boiling Point:** 258°F

**Vapor Pressure:** 12 mm Hg @ 20°C (aliphatic alcohol)

**Vapor Density (air =1):** Greater than 1

**Specific Gravity:** 0.87

**Melting Point:** Not applicable

**Water Solubility:** Negligible

**Evaporation Rate (ether=1):** Less than 1

**SECTION 10: STABILITY AND REACTIVITY**

**Stability:** Stable under normal conditions of storage or use.

**Incompatibility/Conditions to Avoid:** Avoid strong oxidizing agents, reducing agents, acids, bases, amines, alkanolamines, ammonia, chlorinated compounds. Avoid heat, sparks, flames and all other sources of ignition.

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# MSDS # 014258

KROIL  
6/7/05

**Hazardous Decomposition Products:** Combustion will produce oxides of carbon, organic compounds, smoke and fumes.

**Hazardous Polymerization:** Will not occur.

## SECTION 11: TOXICOLOGICAL INFORMATION

Toxicological testing has not been performed on this product as a mixture.

The calculated acute toxicity values, as determined by the DOT and other agency standard formula are: Oral LD50 = 2270; Dermal LD50 = 1500 mg/kg. Kroil is not classified as toxic under workplace or transportation criteria.

## SECTION 12: ECOLOGICAL INFORMATION

No data available.

## SECTION 13: DISPOSAL INFORMATION

Dispose in accordance with all local, state and federal regulations.

## SECTION 14: TRANSPORT INFORMATION

**DOT Shipping Name:** Exempted from Hazmat when packaged in non-bulk containers (<119 gal) and shipped ground

**DOT Hazard Class/Packing Group:** None

**UN Number:** None

**DOT Labels Required (49CFR172.101):** None

**Hazardous Substance (49CFR172.101):** None

**Reportable Quantity:** None

**DOT Marine Pollutants:** This product does not contain marine pollutants as defined in 49CFR 171.8.

**IATA Shipping Name:** Flammable liquid, n.o.s. (Aliphatic Alcohols, Petroleum Distillates)

**IATA Hazard Class/Packing Group:** 3, III

**UN Number:** UN1993

**IATA Hazard Labels Required:** Class 3

## SECTION 15: REGULATORY INFORMATION

### U.S. FEDERAL REGULATIONS:

**CERCLA 103 Reportable Quantity:** This product is not subject to CERCLA reporting requirements, however, oil spills are reportable to the National Response Center under the Clean Water Act and many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

**SARA TITLE III:**

**Hazard Category for Section 311/312:** Acute Health, Chronic Health, Fire Hazard

**Section 313 Toxic Chemicals:** This product contains the following chemicals subject to SARA Title III Section 313 Reporting requirements:

Aliphatic Alcohol	78-92-2	1-5%
Glycol Ether	111-76-2	1-5%
1,2,4-Trimethylbenzene	95-63-6	5 - < 5%

**Section 302 Extremely Hazardous Substances (TPQ):** None

**EPA Toxic Substances Control Act (TSCA) Status:** All of the components of this product are listed on the TSCA inventory.

**SECTION 16: OTHER INFORMATION**

**HMIS Ratings:** Health - 1      Flammability - 2      Reactivity - 0  
**NFPA Ratings:** Health - 1      Flammability - 2      Reactivity - 0

=====  
 The information contained herein has been developed based upon current available scientific data. New information may be developed from time to time which may render the conclusions of this report obsolete. Therefore, no warranty is extended as to the applicability of this information to the user's intended purpose or the consequences of its use or misuse.

# MATERIAL SAFETY DATA SHEET

SAFEGARD 5022A

MSDS # 020641

## SECTION I

### Manufacturer

Sanchem Inc  
1600 S. Canal St.  
Chicago, IL 60616  
312-733-6100

### TSCA Status

Components listed.  
CAS Number: Mixture.

### Transportation Emergency Telephone Formula

CHEMTREC: (800) 424-9300

Mixture.

## SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

None in reportable quantities per OSHA 1910.1200. See Section VI and X.

## SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS (Typical data, not specifications)

Boiling Point  
212°F (100°C)

Freeze Point  
32°F (0°C)

Specific Gravity (H<sub>2</sub>O:= 1)  
1.0-1.2

Solubility in Water  
Soluble in alkaline  
water.

% Volatile by Weight  
57-66% water

Vapor Density (Air = 1)  
water: 0.63

Vapor Pressure  
Water: 17

pH  
5-8

Appearance and Odor  
Hazy or while milky liquid.  
Slight acrylate odor.

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# MATERIAL SAFETY DATA SHEET

SAFEGARD 5022A

MSDS # 020641

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Chicago, IL 60616  
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### Transportation Emergency Telephone Formula

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Mixture.

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None in reportable quantities per OSHA 1910.1200. See Section VI and X.

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Boiling Point  
212°F (100°C)

Freeze Point  
32°F (0°C)

Specific Gravity (H<sub>2</sub>O=1)  
1.0-1.2

Solubility in Water  
Soluble in alkaline  
water.

% Volatile by Weight  
57-66% water

Vapor Density (Air = 1)  
water: 0.63

Vapor Pressure  
Water: 17

pH  
5-8

Appearance and Odor  
Hazy or while milky liquid.  
Slight acrylate odor.

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SECTION IV – FIRE AND EXPLOSION HAZARD DATA

**MSDS # 020641**

Flash Point  
Not applicable (NA),  
water solution.

Ignition Temperature  
NA

Flammable Limits in Air  
(% by volume) Lower: NA  
Upper: NA

Extinguishing Media

If water is evaporated, dry polymer could burn. Water spray, ABC dry chemical and protein type air foams are effective. Carbon dioxide may be ineffective on larger fires due to a lack of cooling capacity within may result in reignition.

Special Firefighting Procedure

Wear positive pressure self-contained breathing apparatus (SCBA). Personnel not having suitable respiratory protection must leave the area to prevent significant exposure to toxic combustion gases from any source. In enclosed or poorly ventilated areas, wear SCBA during cleanup immediately after a fire as well as during the attack phase of firefighting operations.

Unusual Fire and Explosion Hazards

None known.

SECTION V – REACTIVITY DATA

Stability  
Stable

Hazardous Polymerization  
Will not occur.

Hazardous Decomposition Products

CO, CO<sub>2</sub>, aromatic and aliphatic hydrocarbons from burning dry polymer.

Incompatibility (conditions/materials to avoid)

- Avoid contact with strong oxidizing agents such as hydrogen peroxide, permanganates, and perchlorates. Depending on the amount of specific materials involved, contact can result in intense heat, boiling flame development, explosion or toxic gas generation.
- Lowering product pH by acid addition may cause precipitation.

SECTION VI – HEALTH HAZARD DATA

No toxicity tests have been conducted on this product. Information presented is our best judgment based upon similar products and/or individual components. As with all products for which limited data baser available, caution must be exercised through the use of protective equipment and handling procedures to minimize exposure.

Threshold Limit Value  
None established for  
product by OSHA or ACGIH.

Carcinogenic Status  
Not listed by IARC,  
NTP or OSHA.

Routes of Exposure  
Eye/skin contact,  
ingestion.

Acute Health Effects

None known. Eye contact may cause irritation. Repeated or prolonged skin contact may cause irritation. Vapors may cause eye and respiratory irritation. NOTICE: Product may contain residual amounts of a processing chemical (trade secret) in amounts <1%, but, infrequently, ≤1.5%. No adverse health effects are expected.

Overexposure to the residual chemical by itself could cause symptoms such as eye and respiratory tract irritation, dizziness, anesthesia, headache, nausea, or vomiting.

	<u>Signs/Symptoms of Exposure</u>	<u>Medical Conditions Aggravated by Exposure</u>
<u>Chronic Health Effects</u> None known	Irritation	None known

Emergency and First Air Procedure

If irritation occurs or persists from any route of exposure, remove the affected individual from the area. See a physician.

EYE CONTACT: Flush eyes with plenty of clean water for at least five (5) minutes while holding eyelids open.

SKIN CONTACT: Wash the affected area with plenty of soap and water.

INGESTION: Dilute by drinking water or milk. Induce vomiting by sticking finger down throat or by giving Syrup of Ipecac. See a physician.

INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult give oxygen. Never give anything by mouth to an unconscious person. Call a physician.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be taken in case material is released or spilled

Contain spill. If spilled in an enclosed area, ventilate. Do not flush liquid into public sewer or water systems. Recover as much as possible for reuse. Absorb remainder with an inter material. Place into closed container and store in a safe location to await disposal. Wash the spill area with soap and water. Change contaminated clothing and launder before reuse. Wear proper personal protective clothing and equipment.

CAUTION: Spilled liquid and dried film and slippery. Use care to avoid falls.

Waste Disposal Method

For waste disposal purposes, this product is not defined or designated as hazardous by current provisions of the Federal (EPA) Resources Conservation and Recovery Act (RCRA, 40CFR261). Liquid or dry material may be disposed of by incineration. Most states prohibit disposal of liquids in landfills. State and local regulations where the waste material is generated, treated and/or disposed must be examined to verify the appropriate waste classification.

Precautions to be taken in handling and storage

- Use under well ventilated conditions.
- Avoid skin and eye contact.
- Wash thoroughly after handling product. Always was up before eating, smoking or using toilet facilities.
- Keep container closed when not in use and upright to prevent leakage.
- Store product where temperatures are between 50-100°F (10-38°C); ideally, 70°F (21°C).
- When neutralizing or adjusting pH, follow all safety precautions regarding proper use of the chemical involved.

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- Storage tanks, pumps, piping and fittings should all be of stainless steel, glass lined carbon steel, glass fiber reinforced polyester, or epoxy or phenolic coated carbon steel. Avoid use of zinc. Copper, iron, aluminum or low carbon steel (these materials will cause either a breakdown of the polymer, discoloration of the resin or reduction of pH by reacting with ammonia present in some products).

SECTION VIII - CONTROL MEASURES

**MSDS # 020641**

Ventilation

Effective general and, if necessary, local exhaust ventilation must always be provided to draw fumes or vapors away from workers to prevent routine inhalation. Ventilation guidelines/techniques may be found in publications such as Industrial Ventilation, 20<sup>th</sup> Edition, American Conference of Governmental Industrial Hygienists, 6500 Glenway Avenue, Bldg. d-7, Cincinnati, OH 45211-4438.

Respiratory Protection

Not normally required. Wear an organic vapor respirator approved by NIOSH/MSHA whenever exposure to fumes or vapors cannot be avoided. Use respirator in accordance with manufacturer's use limitation and OSHA standard 1910-134 (29CFR).

Protective Equipment

- Wear eye protection (splash goggles where spilling or splashing may occur).
- Wear water resistant protective gloves.

SECTION IX - TRANSPORTATION

For domestic transportation purposes, this product is not known to be defined or designated as a hazardous material by the U.S. Department of Transportation under Title 49 of the Code of Federal Regulations, 1986 Edition.

- DOT Proper Shipping Name: Not applicable
- DOT Hazard Class: Not applicable
- DOT Label: Not applicable
- UN/NA Hazard No.: Not applicable
- Reportable Quantity (RQ): Not applicable

SECTION X - HAZARD CLASSIFICATION

Federal

- SARA Title III (40CFR311/312) Hazard Category: Not known to be applicable.
- SARA Title III Section 313 Toxic Chemicals present at or above de minimus concentrations: None known.

State

While we do not specifically analyze these products, or the raw materials used in their manufacture, for substances on various state hazardous substances lists; to the best of our knowledge no such substances are present except those specifically listed below.

- California Proposition 65: "substances known to the State of California to cause cancer, birth defects or other reproductive harm": None known.
- Massachusetts Substance List: Ammonia\* (I).

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- New Jersey Workplace Hazardous Substance List: Ammonia \*
- Pennsylvania Right to Known Act: (1) Contains trade secret chemical typically before the reporting concentration. (2) Ammonia\* (I)

\*Ammonia (C.A.S. 7664-41-7) is present at approximately 0.4%

International

**MSDS # 020641**

- Canadian Controlled Products Regulation (WHMIS): Not known to be applicable.
- Canadian Ingredient Disclosure List (WHMIS): None known in reportable amounts.
- European Economic Community: Not known to be applicable.
- European Economic Community EINECS: Monomers listed.

NFPA 704\*

Health: 0  
 Flammability: 0  
 Reactivity: 0  
 Special: None

HMIS\*\*

Health: 1  
 Flammability: 0  
 Reactivity: 0  
 Personal Protection: B (Goggles, gloves)

Key: 0 = Insignificant; 1 = Slight; 2 = Moderate; 3 = High; 4 = Extreme.

\* National Fire Protection Association rating identified the severity of hazardous of material during a fire emergency (i.e., "on fire")

\*\* Hazardous Materials Identification Systems, National Paint and Coatings Association rating applies to product "as packaged" (i.e., ambient temp.).

USER'S RESPONSIBILITY

This bulletin cannot cover all possible situations which the user may experience during processing. Each aspect of your operation should be examined to determine if, or where, additional precautions may be necessary. All health and safety information contained in this bulletin should be provided to your employees or customers. It is your responsibility to use this information to develop appropriate work practice guidelines and employee instructional programs for your operation.

DISCLAIMER OF LIABILITY

As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this material. Information contained herein is believed to be true and accurate but all statements or suggestions are made with out warranty, expressed or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state and local laws and regulations remains the responsibility of the user.

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**DOW CORNING****DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 1 of 7

**DOW CORNING 200(R) FLUID, 20 CST.****1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY**Dow Corning Corporation  
South Saginaw Road  
Midland, Michigan 48686**24 Hour Emergency Telephone: (989) 496-5900**  
Customer Service: (989) 496-6000  
Product Disposal Information: (989) 496-6315  
CHEMTREC: (800) 424-9300

MSDS No.: 01013173

Revision Date: 2002/05/01

Generic Description: Silicone  
Physical Form: Liquid  
Color: Colorless  
Odor: Odorless

NFPA Profile: Health 0 Flammability 1 Instability/Reactivity 0

Note: NFPA = National Fire Protection Association

**2. OSHA HAZARDOUS COMPONENTS**

None present. This is not a hazardous material as defined in the OSHA Hazard Communication Standard.

**3. EFFECTS OF OVEREXPOSURE**Acute Effects

**Eye:** Direct contact may cause temporary redness and discomfort.

**Skin:** No significant irritation expected from a single short-term exposure.

**Inhalation:** No significant effects expected from a single short-term exposure.

**Oral:** Low ingestion hazard in normal use.

Prolonged/Repeated Exposure Effects

**Skin:** No known applicable information.

**Inhalation:** No known applicable information.

**Oral:** No known applicable information.

Signs and Symptoms of Overexposure

No known applicable information.

Medical Conditions Aggravated by Exposure

No known applicable information.

The above listed potential effects of overexposure are based on actual data, results of studies performed upon similar compositions, component data and/or expert review of the product. Please refer to Section 11 for the detailed toxicology information.

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**DOW CORNING****DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 2 of 7

**DOW CORNING 200(R) FLUID, 20 CST.****4. FIRST AID MEASURES**

Eye: Immediately flush with water.

Skin: No first aid should be needed.

Inhalation: No first aid should be needed.

Oral: No first aid should be needed.

Comments: Treat symptomatically.

**5. FIRE FIGHTING MEASURES**

Flash Point: > 214 °F / > 101.1 °C (Closed Cup)

Autoignition Temperature: Not determined.

Flammability Limits in Air: Not determined.

Extinguishing Media: On large fires use dry chemical, foam or water spray. On small fires use carbon dioxide (CO<sub>2</sub>), dry chemical or water spray. Water can be used to cool fire exposed containers.

Fire Fighting Measures: Self-contained breathing apparatus and protective clothing should be worn in fighting large fires involving chemicals. Determine the need to evacuate or isolate the area according to your local emergency plan. Use water spray to keep fire exposed containers cool.

Unusual Fire Hazards: None.

**Hazardous Decomposition Products**

Thermal breakdown of this product during fire or very high heat conditions may evolve the following hazardous decomposition products: Carbon oxides and traces of incompletely burned carbon compounds. Silicon dioxide. Formaldehyde.

**6. ACCIDENTAL RELEASE MEASURES**

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**DOW CORNING****DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 3 of 7

**DOW CORNING 200(R) FLUID, 20 CST.**

**Containment/Clean up:** Determine whether to evacuate or isolate the area according to your local emergency plan. Observe all personal protection equipment recommendations described in Sections 5 and 8. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbant. Clean area as appropriate since some silicone materials, even in small quantities, may present a slip hazard. Final cleaning may require use of steam, solvents or detergents. Dispose of saturated absorbant or cleaning materials appropriately, since spontaneous heating may occur. Local, state and federal laws and regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which federal, state and local laws and regulations are applicable. Sections 13 and 15 of this MSDS provide information regarding certain federal and state requirements.

Note: See section 8 for Personal Protective Equipment for Spills. Call Dow Corning Corporation, (989) 496-5900, if additional information is required.

**7. HANDLING AND STORAGE**

Use with adequate ventilation. Avoid eye contact.

Use reasonable care and store away from oxidizing materials.

**8. EXPOSURE CONTROLS / PERSONAL PROTECTION****Component Exposure Limits**

There are no components with workplace exposure limits.

**Engineering Controls**

Local Ventilation: None should be needed.  
General Ventilation: Recommended.

**Personal Protective Equipment for Routine Handling**

Eyes: Use proper protection - safety glasses as a minimum.  
Skin: Washing at mealtime and end of shift is adequate.  
Suitable Gloves: No special protection needed.  
Inhalation: No respiratory protection should be needed.  
Suitable Respirator: None should be needed.

**Personal Protective Equipment for Spills**

Eyes: Use proper protection - safety glasses as a minimum.  
Skin: Washing at mealtime and end of shift is adequate.

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**DOW CORNING****DOW CORNING CORPORATION  
Material Safety Data Sheet**

Page: 4 of 7

**DOW CORNING 200(R) FLUID, 20 CST.**

Inhalation/Suitable Respirator: No respiratory protection should be needed.

Precautionary Measures: Avoid eye contact. Use reasonable care.

Comments: When heated to temperatures above 150 degrees C in the presence of air, product can form formaldehyde vapors. Formaldehyde is a potential cancer hazard, a known skin and respiratory sensitizer, and an irritant to the eyes, nose, throat, skin, and digestive system. Safe handling conditions may be maintained by keeping vapor concentrations within the OSHA Permissible Exposure Limit for formaldehyde.

Note: These precautions are for room temperature handling. Use at elevated temperature or aerosol/spray applications may require added precautions.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Physical Form: Liquid  
 Color: Colorless  
 Odor: Odorless  
 Specific Gravity @ 25°C: 0.95  
 Viscosity: 20 cSt  
 Freezing/Melting Point: Not determined.  
 Boiling Point: > 35C/95F  
 Vapor Pressure @ 25°C: Not determined.  
 Vapor Density: Not determined.  
 Solubility in Water: Not determined.  
 pH: Not determined.  
 Volatile Content: Not determined.

Note: The above information is not intended for use in preparing product specifications. Contact Dow Corning before writing specifications.

**10. STABILITY AND REACTIVITY**

Chemical Stability: Stable.  
 Hazardous Polymerization: Hazardous polymerization will not occur.  
 Conditions to Avoid: None.  
 Materials to Avoid: Oxidizing material can cause a reaction.

**11. TOXICOLOGICAL INFORMATION****Special Hazard Information on Components**

No known applicable information.

**12. ECOLOGICAL INFORMATION****Environmental Fate and Distribution**

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**DOW CORNING****DOW CORNING CORPORATION  
Material Safety Data Sheet**

Page: 5 of 7

**DOW CORNING 200(R) FLUID, 20 CST.**

- Air:** This product is a high molecular weight liquid polymer which has a very low vapour pressure (<1 mm Hg). As a result it is unlikely to become an atmospheric contaminant unless generated as an aerosol.
- Water:** This product has a very low water solubility (< 100 ppb). As it has a specific gravity of < 1, if discharged to water, it will initially form a surface film. As the product is non volatile and has a high binding affinity for particulate matter, it will adsorb to particulates and sediment out.
- Soil:** If discharged to surface water, this product will bind to sediment. If discharged in effluent to a waste water treatment plant, the product is removed from the aqueous phase by binding to sewage sludge. If the sewage sludge is subsequently spread on soil, the silicone product is expected to degrade.
- Degradation:** This product, polydimethylsiloxane, degrades in soil abiotically to form smaller molecules. These in turn are either biodegraded in soil or volatilized into the air where they are broken down in the presence of sunlight. Under appropriate conditions, the ultimate degradation products are inorganic silica, carbon dioxide and water vapour. Due to the very low water solubility of this product, standard OECD protocols for ready and inherent biodegradability are not suitable for measuring the biodegradability of this product. The product is removed >80% during the sewage treatment process.

**Environmental Effects**

- Toxicity to Water Organisms:** Based on analogy to similar materials this product is expected to exhibit low toxicity to aquatic organisms.
- Toxicity to Soil Organisms:** Experiments show that when sewage sludge containing polydimethylsiloxane is added to soil, it has no effect on soil micro-organisms, earthworms or subsequent crops grown in the soil.
- Bioaccumulation:** This product is a liquid and is a high molecular weight polymer. Due to its physical size it is unable to pass through, or be absorbed by biological membranes. This has been confirmed by testing or analogy with similar products.

**Fate and Effects in Waste Water Treatment Plants**

This product or similar products has been shown to be non-toxic to sewage sludge bacteria.

**Ecotoxicity Classification Criteria**

Hazard Parameters (LC50 or EC50)	High	Medium	Low
Acute Aquatic Toxicity (mg/L)	<=1	>1 and <=100	>100
Acute Terrestrial Toxicity	<=100	>100 and <= 2000	>2000

This table is adapted from "Environmental Toxicology and Risk Assessment", ASTM STP 1179, p.34, 1993.

This table can be used to classify the ecotoxicity of this product when ecotoxicity data is listed above. Please read the other information presented in the section concerning the overall ecological safety of this material.

**13. DISPOSAL CONSIDERATIONS****RCRA Hazard Class (40 CFR 261)**

6A

**DOW CORNING****DOW CORNING CORPORATION**  
**Material Safety Data Sheet**

Page: 6 of 7

**DOW CORNING 200(R) FLUID, 20 CST.**

When a decision is made to discard this material, as received, is it classified as a hazardous waste? No

State or local laws may impose additional regulatory requirements regarding disposal.

Call Dow Corning Corporate Environmental Management, (989) 496-6315, if additional information is required.

**14. TRANSPORT INFORMATION****DOT Road Shipment Information (49 CFR 172.101)**

Not subject to DOT.

**Ocean Shipment (IMDG)**

Not subject to IMDG code.

**Air Shipment (IATA)**

Not subject to IATA regulations.

Call Dow Corning Transportation, (989) 496-8577, if additional information is required.

**15. REGULATORY INFORMATION**

Contents of this MSDS comply with the OSHA Hazard Communication Standard 29 CFR 1910.1200.

TSCA Status: All chemical substances in this material are included on or exempted from listing on the TSCA Inventory of Chemical Substances.

**EPA SARA Title III Chemical Listings****Section 302 Extremely Hazardous Substances:**

None.

**Section 304 CERCLA Hazardous Substances:**

None.

**Section 312 Hazard Class:**

Acute: No  
Chronic: No  
Fire: No  
Pressure: No  
Reactive: No

**Section 313 Toxic Chemicals:**

None present or none present in regulated quantities.

**Supplemental State Compliance Information**

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**DOW CORNING****DOW CORNING CORPORATION  
Material Safety Data Sheet**

Page: 7 of 7

**DOW CORNING 200(R) FLUID, 20 CST.****California**

Warning: This product contains the following chemical(s) listed by the State of California under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as being known to cause cancer, birth defects or other reproductive harm.

None known.

**Massachusetts**

No ingredient regulated by MA Right-to-Know Law present.

**New Jersey**

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
63148-62-9	> 60.0	Polydimethylsiloxane

**Pennsylvania**

<u>CAS Number</u>	<u>Wt %</u>	<u>Component Name</u>
63148-62-9	> 60.0	Polydimethylsiloxane

**16. OTHER INFORMATION**

Prepared by: Dow Corning Corporation

These data are offered in good faith as typical values and not as product specifications. No warranty, either expressed or implied, is hereby made. The recommended industrial hygiene and safe handling procedures are believed to be generally applicable. However, each user should review these recommendations in the specific context of the intended use and determine whether they are appropriate.

(R) indicates Registered Trademark

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QUICK 'n BRITE, INC.  
22313 70th Avenue West  
Mountlake Terrace, WA 98043  
Emergency Phone: 425-778-8285

MSDS # 023671

N/A = NOT APPLICABLE  
NA = NOT AVAILABLE

MATERIAL SAFETY DATA SHEET  
PRODUCT NAME: QUICK 'n BRITE  
PASTE

Prepared By: K. Woods in accordance with OSHA and WHMIS requirements

Date: March 3, 2000

CHEMICAL FAMILY: Mixture

FORMULA. Proprietary Mixture of Sodium Cocoate, emulsifiers, water conditioners, and water

HAZARDOUS INGREDIENTS (CAS #):	%	EXPOSURE LIMITS, ppm:	ACGIH TLV	OSHA-PEL
NONE	N/A		N/A	N/A

This product contains no ingredients considered hazardous according to the criteria of 29 CFR 1910.1200 or listed on the Ingredient Disclosure List. This product contains no chemical regulated under SARA 313 as a reportable substance.

CARCINOGENIC INGREDIENTS: Contains no known or suspected carcinogens.

PHYSICAL PROPERTIES:

Boiling Point: about 200 degrees F  
Solubility in Water: Appreciable  
Specific Gravity - Liquid (H<sub>2</sub>O = 1): 1.01-1.02  
Odor and Appearance: Pink paste; mild scent  
pH (as is): 8.0-9.5

% Volatiles: N/A (Non-volatile mixture)  
% Volatile Organic Content (VOC): 0  
Vapor Pressure: N/A  
Vapor Density (Air=1): N/A

FIRE AND EXPLOSION DATA:

Flash Point: None  
Extinguishing Media: Water, CO<sub>2</sub>, foam, dry chemical  
Special Firefighting Procedures: None

Flammability Limits: N/A  
Unusual Hazards: None

HEALTH EFFECTS:

Effects of overexposure: May cause minor temporary eye irritation. Ingestion may cause nausea or diarrhea.  
Chronic effects of overexposure: None known or expected.  
Medical conditions that may be aggravated by exposure: None known or expected.  
Primary routes of entry: Ingestion

EMERGENCY AND FIRST AID PROCEDURES:

Eye Contact: Flush thoroughly with plenty of water for several minutes. If irritation persists, see a physician.  
Skin Contact: Flush thoroughly from skin with water. If irritation persists, see a physician.  
Ingestion: Drink plenty of water and call a physician immediately.  
Inhalation of dust: N/A

REACTIVITY DATA:

Stability: Stable  
Incompatibility: None  
Conditions to Avoid: None

Hazardous Polymerization: Will not occur.  
Hazardous Decomposition Products: None

SPILL OR LEAKAGE PROCEDURES:

Steps to be taken if material is released or spilled: Scoop up excess and place in a closed container. Scrub area well to reduce slipperiness.  
Waste disposal method: According to local, state, or federal ordinances. Not a hazardous or regulated waste.

SPECIAL PROTECTION INFORMATION:

Ventilation: No special ventilation required.  
Respiration Protection: None required.  
Eye Protection: None required  
Protective Gloves: None required  
Other Protective Equipment: None required.

SPECIAL PRECAUTIONS:

Precautions to be taken in handling and storage: Store in closed container in a dry place. Wash thoroughly after handling.  
KEEP OUT OF REACH OF CHILDREN.  
Other precautions: None

HAZARD RATING:

Health:	0	0 = Minimal	3 = Serious
Fire:	0	1 = Slight	4 = Severe
Reactivity:	0	2 = Moderate	

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CH2M BILL OF MATERIAL

ORIGINAL

B.O.M. Suppl. 0

End Use: SX-113 Radial Filter				Wk. Pkg. No.: CLO-WO-08-0564				CACN/COA: 501956/FA30				
Date: 03/26/2008		Requestor: Hjellum, AI		Delivery Location: 2101 HV			Premium Freight <input type="checkbox"/>		Priority: 2.1		CGI:	
Date Required: 04/03/2008		Special Instructions/Emergency Justification: Items having approval designator Q* shall be inspected for suspect / counterfeit items.			Hjellum, AI (372-2540) 03/26/2008		Not Required per DRA					
<input type="checkbox"/> Mandatory <input checked="" type="checkbox"/> Desired					Requestor		Date		Manager		Date	
Suggested Vendor: Various					Farris, Troy R (430-3136) 03/28/2008		Bores, John F (376-8131) 03/28/2008					
QA Clauses: Items 1, 2, 3, and 7: N/A Items 4, 5, and 6: Material-on-hand (B clauses already satisfied)					Engineer		Date		QA Engineer		Date	
					Not Required per DRA				Not Required per DRA			
					RadCon		Date		Environmental		Date	
					Not Required per DRA				Not Required per DRA			
					Industrial Health		Date		Chemical Management		Date	
					Not Required per DRA				Not Required per DRA			
		Safety & Health		Date		Resp. Protection		Date				
		Not Required per DRA				Duncan, Vella (373-3852) 03/28/2008						
		Cost Account Manager		Date		Material Coordinator Manager		Date				
		Shults, Duane L (373-4244) 03/31/2008										
		Material Coordinator		Date								

Item	Quantity	Estimated Cost	Safety Class	HAZMAT	MSDS	NRTL	Approval Desig.	Quality Level	QC Approval	Date/Qty Ordered	Order No.	Catalog No.
1	10	8.00	GS				Q*	0	JE 4/14/08	03/31/2008, 10.00	H00689101538	PC00032753
	Unit	Delivery Date	Storage Level			Date/Qty Staged			Storage Bldg/Area		Storage Location	
	EACH		B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)			04/14/2008, 10.00			2101HV/200E		R7-E2	

Material Description: BOLT, HEAVY HEX, 5/8-11UNC-2A X 2 IN. LONG, ASTM A193 GR. B8						Additional Description:					
Purchasing Description:						Comments:					
Part Number *N/A			Equipment Type FASTENERS			Manufacturer NOT APPLICABLE			Drawing/ECN/Spec Number H-2-90718, Sht 25, PN196		

Item	Quantity	Estimated Cost	Safety Class	HAZMAT	MSDS	NRTL	Approval Desig.	Quality Level	QC Approval	Date/Qty Ordered	Order No.	Catalog No.
2	2	5.00	GS				N/A	0		04/14/2008, 2.00	MOH	OTH0006609
	Unit	Delivery Date	Storage Level			Date/Qty Staged			Storage Bldg/Area		Storage Location	
	EACH		B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)			04/14/2008, 2.00			2101HV/200E		SHOP	

Material Description: Gasket, 4" x 1/8" Thk for 4" 150# Flange, Compressed Fiber Non Asbestos						Additional Description: Garlock "Blue-Gard" Style 3000					
Purchasing Description:						Comments:					
Part Number NA			Equipment Type GASKET/SEALS/O-RING/PACK			Manufacturer Garlock			Drawing/ECN/Spec Number H-2-90718, Sht 25, PN172		

Item	Quantity	Estimated Cost	Safety Class	HAZMAT	MSDS	NRTL	Approval Desig.	Quality Level	QC Approval	Date/Qty Ordered	Order No.	Catalog No.
3	2	5.00	GS				Q*	0	JE 4/14/08	04/14/2008, 2.00	MOH	OTH006610
	Unit	Delivery Date	Storage Level			Date/Qty Staged			Storage Bldg/Area		Storage Location	

EACH		B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)				04/14/2008, 2.00		2101HV/200E		R7-E2		
<b>Material Description:</b> Nut, Winged 3/8"-16UNC Washer						<b>Additional Description:</b>						
<b>Purchasing Description:</b>						<b>Comments:</b>						
<b>Part Number</b> NA			<b>Equipment Type</b> FASTENERS			<b>Manufacturer</b> Various			<b>Drawing/ECN/Spec Number</b> H-2-90718, Sht 25, PN190			
<b>Item</b>	<b>Quantity</b>	<b>Estimated Cost</b>	<b>Safety Class</b>	<b>HAZMAT</b>	<b>MSDS</b>	<b>NRTL</b>	<b>Approval Desig.</b>	<b>Quality Level</b>	<b>QC Approval</b>	<b>Date/Qty Ordered</b>	<b>Order No.</b>	<b>Catalog No.</b>
4	1	250.00	GS				Q	3	JE 4-14-08	04/14/2008, 1.00	MOH	0000627323
	<b>Unit</b>	<b>Delivery Date</b>	<b>Storage Level</b>			<b>Date/Qty Staged</b>			<b>Storage Bldg/Area</b>	<b>Storage Location</b>		
	EACH		B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)			04/14/2008, 1.00			2101HV/200E	R7-E2		
<b>Material Description:</b> 40 cfm Weather Cover						<b>Additional Description:</b>						
<b>Purchasing Description:</b>						<b>Comments:</b> Material on hand and already green-tagged GS/QL-3. No QAIP required.						
<b>Part Number</b> 205			<b>Equipment Type</b> HVAC			<b>Manufacturer</b> Various			<b>Drawing/ECN/Spec Number</b> H-2-90718, Sht 25, PN205			
<b>Item</b>	<b>Quantity</b>	<b>Estimated Cost</b>	<b>Safety Class</b>	<b>HAZMAT</b>	<b>MSDS</b>	<b>NRTL</b>	<b>Approval Desig.</b>	<b>Quality Level</b>	<b>QC Approval</b>	<b>Date/Qty Ordered</b>	<b>Order No.</b>	<b>Catalog No.</b>
5	1	50.00	GS				Q	3	JE 4-14-08	04/14/2008, 1.00	MOH	OTH0006611
	<b>Unit</b>	<b>Delivery Date</b>	<b>Storage Level</b>			<b>Date/Qty Staged</b>			<b>Storage Bldg/Area</b>	<b>Storage Location</b>		
	EACH		B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)			04/14/2008, 1.00			2101HV/200E	R7-E2		
<b>Material Description:</b> 40 cfm Breather Filter Bird Screen						<b>Additional Description:</b> Fabricate Bird Screen - 1/2" Stainless Expanded Metal						
<b>Purchasing Description:</b> See H-2-90718, Sht 16, PN228 and 229.						<b>Comments:</b> Item 5 may be either existing material located in 2101HV, or item purchased and fabricated by package CLO-WO-07-1618 (Supp 4). No QAIP required.						
<b>Part Number</b> NA			<b>Equipment Type</b> HVAC			<b>Manufacturer</b> Various			<b>Drawing/ECN/Spec Number</b> H-2-90718, Sht 25, PN 229			
<b>Item</b>	<b>Quantity</b>	<b>Estimated Cost</b>	<b>Safety Class</b>	<b>HAZMAT</b>	<b>MSDS</b>	<b>NRTL</b>	<b>Approval Desig.</b>	<b>Quality Level</b>	<b>QC Approval</b>	<b>Date/Qty Ordered</b>	<b>Order No.</b>	<b>Catalog No.</b>
6	1	4000.00	GS				Q	3	JE 4-14-08	04/14/2008, 1.00	MOH	OTH0006612
	<b>Unit</b>	<b>Delivery Date</b>	<b>Storage Level</b>			<b>Date/Qty Staged</b>			<b>Storage Bldg/Area</b>	<b>Storage Location</b>		
	EACH		B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)			04/14/2008, 1.00			2101HV/200E	R7-E2		
<b>Material Description:</b> 4" dia filter mounting flange assembly (Flange Subassembly)						<b>Additional Description:</b> 40 cfm Filter Mounting Flange Sub Assy.						
<b>Purchasing Description:</b>						<b>Comments:</b> Material on hand and already green-tagged GS/QL-3. No QAIP required.						
<b>Part Number</b> NA			<b>Equipment Type</b> HVAC			<b>Manufacturer</b> Various			<b>Drawing/ECN/Spec Number</b> H-2-90718, Sht 25, PN223			
<b>Item</b>	<b>Quantity</b>	<b>Estimated Cost</b>	<b>Safety Class</b>	<b>HAZMAT</b>	<b>MSDS</b>	<b>NRTL</b>	<b>Approval Desig.</b>	<b>Quality Level</b>	<b>QC Approval</b>	<b>Date/Qty Ordered</b>	<b>Order No.</b>	<b>Catalog No.</b>
7	10	0.00	GS				Q	0	JE 4-14-08	03/31/2008, 10.00	H00689101538	PC00032754
	<b>Unit</b>	<b>Delivery Date</b>	<b>Storage Level</b>			<b>Date/Qty Staged</b>			<b>Storage Bldg/Area</b>	<b>Storage Location</b>		
	EACH		B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)			04/14/2008, 10.00			2101HV/200E	R7-E2		
<b>Material Description:</b> BOLT, HEAVY HEX, 5/8-11UNC-2A X 1-3/4 IN. LONG, ASTM A193 GR. B8						<b>Additional Description:</b>						
<b>Purchasing Description:</b>						<b>Comments:</b>						

Part Number N/A	Equipment Type FASTENERS	Manufacturer Any	Drawing/ECN/Spec Number H-2-90718, Sht 25, PN201
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**PARTIAL RELEASE**

Line # Released: \_\_\_\_\_

Date Released: \_\_\_\_\_ Released To: \_\_\_\_\_

Signature: \_\_\_\_\_

**RELEASED COMPLETE**

Line # Released: ALL Released To: STEVE WADE

Signature: Steve Wade 4-15-08

*HL*

CH2M BILL OF MATERIAL

ORIGINAL

B.O.M. Suppl. 1

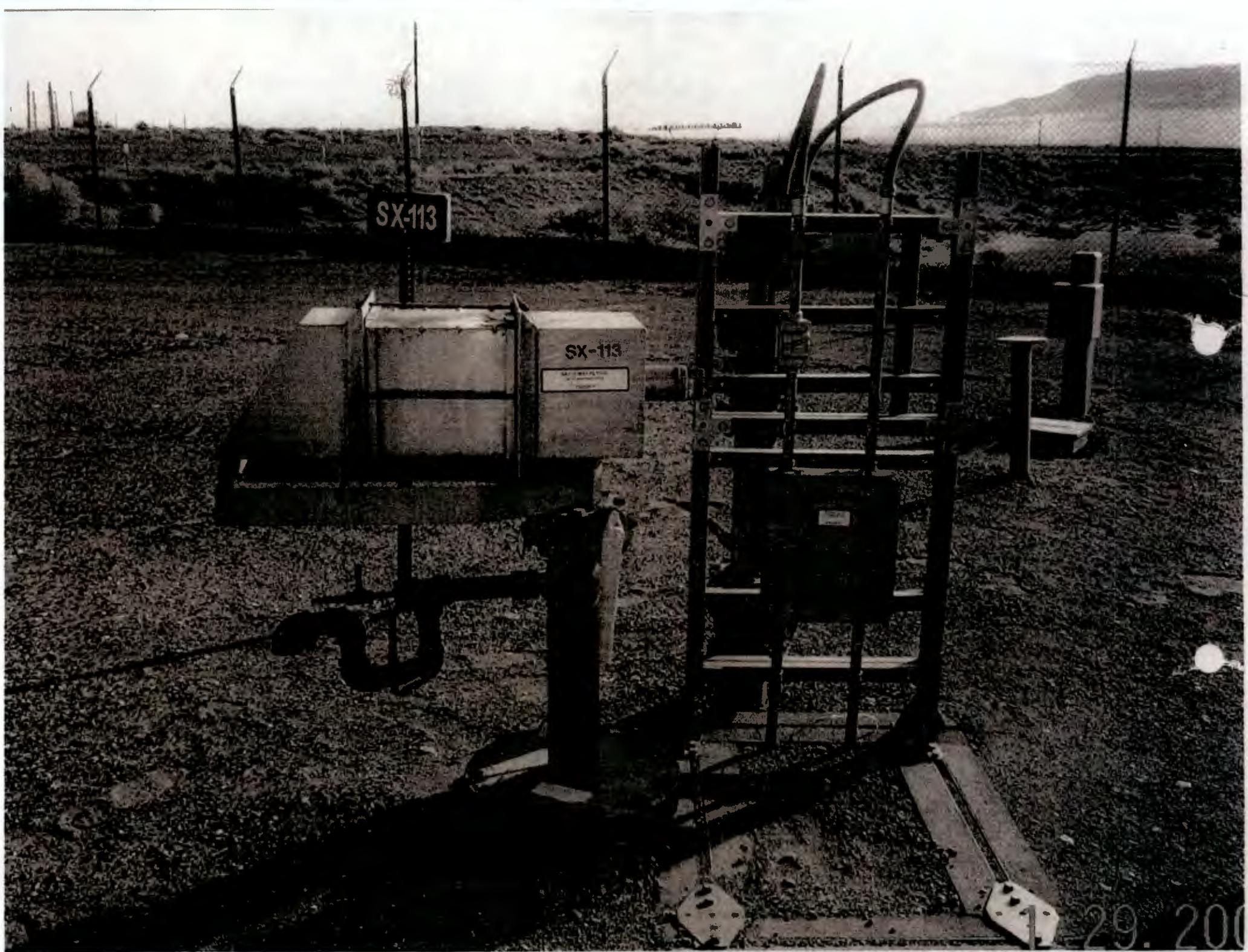
End Use: SX-113 Radial Filter		Wk. Pkg. No.: CLO-WO-08-0564		CACN/COA: 501956/FA30																																											
Date: 04/03/2008	Requestor: Gauck, Gregory J	Delivery Location: 2101 HV	Premium Freight <input type="checkbox"/>	Priority: 2.1	CGI:																																										
Date Required: <u>04/04/2008</u> <input type="checkbox"/> Mandatory <input checked="" type="checkbox"/> Desired		Special Instructions/Emergency Justification: Please assign to Duane Shults		<table border="1"> <tr> <td>Gauck, Gregory J (373-1779)</td> <td>04/03/2008</td> <td>Not Required per DRA</td> </tr> <tr> <td><b>Requestor</b></td> <td><b>Date</b></td> <td><b>Manager</b></td> </tr> <tr> <td>Gauck, Gregory J (373-1779)</td> <td>04/03/2008</td> <td>Bores, John F (376-8131)</td> </tr> <tr> <td><b>Engineer</b></td> <td><b>Date</b></td> <td><b>QA Engineer</b></td> </tr> <tr> <td>Not Required per DRA</td> <td></td> <td>Not Required per DRA</td> </tr> <tr> <td><b>RadCon</b></td> <td><b>Date</b></td> <td><b>Environmental</b></td> </tr> <tr> <td>Not Required per DRA</td> <td></td> <td>Not Required per DRA</td> </tr> <tr> <td><b>Industrial Health</b></td> <td><b>Date</b></td> <td><b>Chemical Management</b></td> </tr> <tr> <td>Not Required per DRA</td> <td></td> <td>Not Required per DRA</td> </tr> <tr> <td><b>Safety &amp; Health</b></td> <td><b>Date</b></td> <td><b>Resp. Protection</b></td> </tr> <tr> <td>Calmus, Ron (372-3385)</td> <td>04/03/2008</td> <td>Duncan, Vella (373-3852)</td> </tr> <tr> <td><b>Cost Account Manager</b></td> <td><b>Date</b></td> <td><b>Material Coordinator Manager</b></td> </tr> <tr> <td>Shults, Duane L (373-4244)</td> <td>04/03/2008</td> <td></td> </tr> <tr> <td><b>Material Coordinator</b></td> <td><b>Date</b></td> <td></td> </tr> </table>		Gauck, Gregory J (373-1779)	04/03/2008	Not Required per DRA	<b>Requestor</b>	<b>Date</b>	<b>Manager</b>	Gauck, Gregory J (373-1779)	04/03/2008	Bores, John F (376-8131)	<b>Engineer</b>	<b>Date</b>	<b>QA Engineer</b>	Not Required per DRA		Not Required per DRA	<b>RadCon</b>	<b>Date</b>	<b>Environmental</b>	Not Required per DRA		Not Required per DRA	<b>Industrial Health</b>	<b>Date</b>	<b>Chemical Management</b>	Not Required per DRA		Not Required per DRA	<b>Safety &amp; Health</b>	<b>Date</b>	<b>Resp. Protection</b>	Calmus, Ron (372-3385)	04/03/2008	Duncan, Vella (373-3852)	<b>Cost Account Manager</b>	<b>Date</b>	<b>Material Coordinator Manager</b>	Shults, Duane L (373-4244)	04/03/2008		<b>Material Coordinator</b>	<b>Date</b>	
Gauck, Gregory J (373-1779)	04/03/2008	Not Required per DRA																																													
<b>Requestor</b>	<b>Date</b>	<b>Manager</b>																																													
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Shults, Duane L (373-4244)	04/03/2008																																														
<b>Material Coordinator</b>	<b>Date</b>																																														
Suggested Vendor: Various																																															
QA Clauses: Items 1: Material-on-hand (B clauses already satisfied)																																															

Item 1	Quantity 1	Estimated Cost 1268.60	Safety Class GS	HAZMAT	MSDS	NRTL	Approval Desig Q	Quality Level 3	QC Approval <b>VEABCS</b>	Date/Qty Ordered 04/03/2008, 1.00	Order No. 10001583	Catalog No. 0000628014
	Unit EACH	Delivery Date	Storage Level B - INDOORS (TEMPERATURE CONTROLLED/WEATHER TIGHT)				Date/Qty Staged 04/08/2008, 1.00	Storage Bldg/Area 2101HV/200E	Storage Location R7-E2			
Material Description: DAMPER, 4 IN. DIA, BUTTERFLY VALVE, FWYE ASSY						Additional Description:						
Purchasing Description:						Comments: This supplemental BOM is needed to support the work package for installation at SX-113. A butterfly valve with a lugged body is needed to replace the currently installed wafer body (single stud) as required by spool piece adapter flange used to install radial filter. Material is on-hand and green-tagged GS/QL-3. No QAIP required.						
Part Number K-LOK 362-173 K-LOK 362-173			Equipment Type VALVES		Manufacturer KEYSTONE		Drawing/ECN/Spec Number H-2-90718, Sht. 25					

RELEASED COMPLETE

Line # Released: ALL Released To: STEVE WADE  
 Signature: Steve Wade 4-15-08

36



SX-113

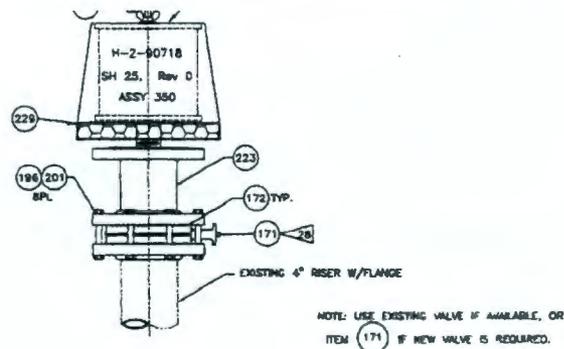
SX-113

29. 200

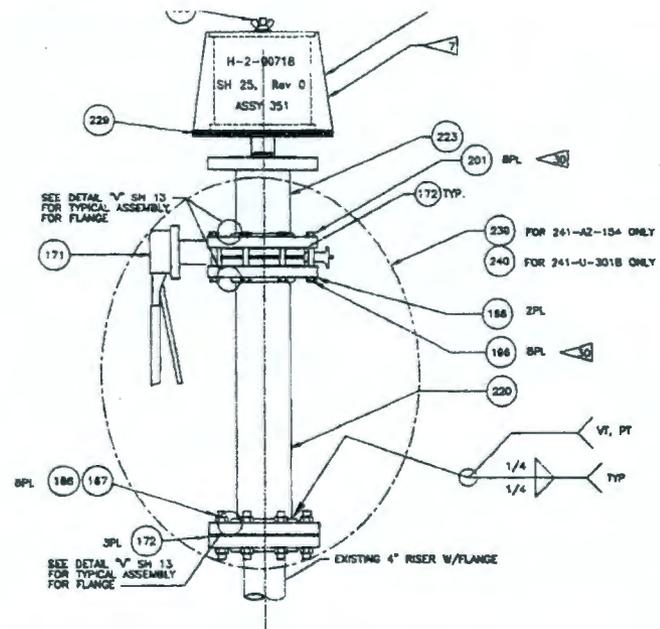


241-SX-113

241-13 Riser 6 Bench Mark



**350** 40 CFM BREATHER FILTER ASSY. W/4" VALVE FOR EXISTING 4"-150# FLANGES  
SCALE: NONE

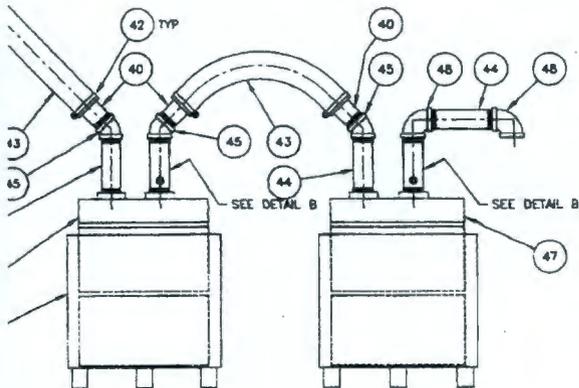


**351** 40 CFM BREATHER FILTER ASSY. W/4" VALVE FOR REPLACING G-1 OR OPEN FACE HEPA FILTER ASSY.  
SCALE: NONE

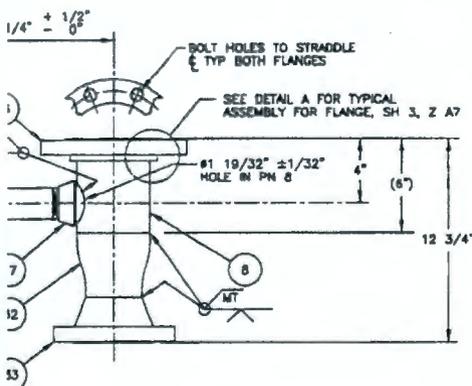
ITEM NO	QUANTITY	ITEM NO	QUANTITY	ITEM NO
190	1	190	1	190
205	1	205	1	205
229	1	229	1	229
223	1	223	1	223
168	8	196	8	196
167				
172	2	172	3	172
	1	171	1	171
			1	220
			8	167
			8	168
	8	201	8	201
			2	166

NAME	DATE
	1/2/57



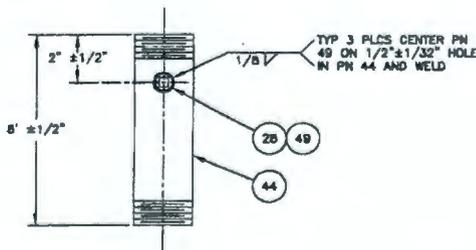


**39 INSTALLATION**  
(NOT TO SCALE)



**1 ASSEMBLY**  
SCALE: 3" = 1'-0"

LL AND TAP  
1 2" NPT



**DETAIL B**  
(NOT TO SCALE)

3. UNLESS OTHERWISE NOTED DIMENSIONAL TOLERANCES SHALL BE: FRACTIONS  $\pm 1/8$ "; ANGLES  $\pm 5$

4. NOT USED

5. VALVE BUTTERFLY 4" - 150#, WAFER IRON BODY, 416 S/S STEEL, 316 S/S DISC, BUMA-N SEAT, MULTI-POSITIONAL HANDLE.

6. PREPARE AND PAINT ALL EXPOSED CARBON STEEL SURFACES WITH PITT/TECH PRIMER DIRECT TO METAL PAINT (MSDS 33820). TWO COATS OF AMERCOAT 220 (MSDS 25821) SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION. FINAL COAT TO BE GRAY.

7. IDENTIFY FILTER ASSY, OMC, #, SH, #, AND ASSY # USING 1/2" MIN. LETTERS, COLOR BLACK. LABELS SHALL BE MADE OF VINYL LABELING MATL LOCATE APPROX. AS SHOWN.

8. WELD AND INSPECT PER ANSI B31.3- LATEST EDITION, VT WELDS AT FINAL PASS. MT OR PT ALL DESIGNATED WELDS AT FINAL PASS AS SPECIFIED.

9. USE TEFLON TAPE ON ALL THREADED PIPE JOINTS.

10. PRIOR TO SETTING PN 46 AND PN 47 INTO PN 50 APPLY HEAT TRACE TO PN 46 AND PN 47 PER NOTE 14A, LEAVING ABOUT 4" OF LEAD ON EACH END FOR SPLICES. ALSO, LAY 2" OF ARMAFLEX II SHEET INSULATION, 2" THICK HAVING A THERMAL CONDUCTIVITY OF 0.27 BTUH/INCH/SQ FT/F IN BOTTOM OF PN 50.

11. PNEUMATIC PRESSURE TEST ASSEMBLIES 37, 38 & 39 AT 3.5 $\pm$ .5 PSIG PER HS-B5-0078, TYPE L FROM PN 41 TO THE EXIT ELBOW AFTER PN 47. USE A GAUGE WITH AN ACCURACY OF  $\pm 2\%$  OVER THE RANGE OF THE GAUGE.

12. ROTATE FLEX HOSE ATTACHMENT PARTS AS NEEDED TO MEET FIELD CONDITIONS

13. FOR ASSEMBLIES 37, 38 & 39, INSTALL THE FLEX HOSE BETWEEN THE HEPA FILTER HOUSING AND PN 46 AT A MIN DROP OF .25"/FT.

14. APPLY HEAT TRACE ASSEMBLIES 37, 38 & 39 FROM PN 8 TO THE EXIT OF THE ASSEMBLY USING THE FOLLOWING CRITERIA. (ALSO SEE NOTE 10)

- A. HEAT TRACE PN 46 & PN 47 TO A POWER OF 200-300 WATTS
- B. HEAT TRACE PN 5 TO POWER 60-150 WATTS
- C. HEAT TRACE THE REMAINING PARTS TO A POWER OF 4-10 WATTS/FT.
- D. USE A POWER CONNECTION KIT TO INITIATE POWER TO THE HEAT TRACE AT PN 5. USE SPLICE KIT AS NEEDED TO CONNECT THE HEAT TRACE AS A CONTINUOUS CIRCUIT USE A SIGNAL LIGHT TO END THE HEAT TRACE CIRCUIT AT THE EXIT OF THE ASSEMBLY. (SEE ECN 146432)

15. AFTER INSTALLATION OF THE HEAT TRACE, INSULATE ASSEMBLIES 37, 38 & 39 PER THE FOLLOWING INSTRUCTIONS. (ALSO SEE NOTE 10)

- A. SECURE ALL INSULATION JOINTS WITH ARMSTRONG 520 ADHESIVE APPLY PER MANUFACTURER'S RECOMMENDATIONS.
- B. USE ALUMINUM BANDS AS NEEDED TO HOLD THE INSULATION IN PLACE.
- C. FINISH THE WEATHER EXPOSED SURFACE OF ALL INSULATION WITH ARMSTRONG STANDARD WHITE COLOR. APPLY PER MANUFACTURER'S RECOMMENDATIONS.
- D. THE INSULATION SHALL NOT INTERFERE WITH THE REMOVAL OF ACCESS DOORS (HEPA FILTER HOUSING), OR THE OPERATION OF VALVES, OR DOP AND SAMPLE PORTS, OR THE MAINTENANCE OF ELECTRICAL EQUIPMENT.
- E. INSULATE THE EXTERIOR OF PN 46 & PN 47 WITH ARMAFLEX II SHEET INSULATION, 2" THICK HAVING A MIN THERMAL CONDUCTIVITY OF 0.27 BTUH/INCH/SQ FT/F AT 75°F MEAN TEMPERATURE. AN AIR SPACE BETWEEN 1" LAYERS IS ACCEPTABLE.
- F. INSULATE THE EXTERIOR OF PN 5 WITH ARMAFLEX II SHEET INSULATION, 2" THICK HAVING A MIN THERMAL CONDUCTIVITY OF 0.27 BTUH/INCH/SQ FT/F AT 75°F MEAN TEMPERATURE. (SEE PART C ABOVE).
- G. INSULATE THE REMAINDER OF THE ASSEMBLIES FROM PN 8 (UNDER PN 6) TO THE EXIT OF THE ASSEMBLY WITH ARMAFLEX II SHEET OR PIPE INSULATION, 1" THICK HAVING A THERMAL CONDUCTIVITY OF 0.27 BTUH/INCH/SQ FT/F AT 75°F MEAN TEMPERATURE. (SEE PART C ABOVE).

16. CONCRETE SHALL HAVE A MAXIMUM SLUMP OF 4 INCHES AND SHALL OBTAIN A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI. PART NOS. 77 AND 59 SHALL BE MADE WITH 2 LAYERS OF 6"x6"x10 GAGE WIRE MESH.

17. INSTALLATION OF SPOOL PIECE ASSEMBLY (PART NO 54) :

- A. MOUNT THE EXPANSION JOINT (PART NO 74) WITH YELLOW SHIPPING STRAPS STILL IN PLACE TO RISER 10A WITH A GASKET (PART NO 24) AND ALL ASSOCIATED FASTENING HARDWARE. **HAND TIGHTEN THE BOLTS ONLY.**
- B. MOUNT THE SPOOL PIECE ASSEMBLY (PART NO 54) TO THE EXPANSION JOINT (PART NO 74) WITH A GASKET (PART NO 24) AND ALL ASSOCIATED FASTENING HARDWARE. **HAND TIGHTEN THE BOLTS ONLY.**
- C. ATTACH THE BLIND FLANGE (PART NO 12) TO THE SPOOL PIECE ASSEMBLY (PART NO 54) WITH A GASKET (PART NO 24) AND ALL ASSOCIATED FASTENING HARDWARE.
- D. LOCATE THE SUPPORT LEG ASSEMBLIES (PART NO 52) ACCORDINGLY. WHEN THE SUPPORT LEG ASSEMBLIES ARE LOCATED CORRECTLY, TIGHTEN ALL BOLTS AND MAKE ALL DESIGNATED WELDS ON THE SUPPORT LEG ASSEMBLIES.
- E. REMOVE THE SHIPPING STRAPS FROM THE EXPANSION JOINT (PART NO 74). AFTER THE SHIPPING STRAPS ARE REMOVED, TORQUE ALL OF THE 12 INCH FLANGE BOLTS TO 120-130 FT-LBS.

20. FOR THE BY-110 FILTER HOUSING RELOCATION (INSTALLATION 51), USE ASTM A193 GR B8, 304SST AND ASTM A194 GR B8, 303 SST FOR PMS, 22 AND 23 RESPECTIVELY INSTEAD OF THE CALLED OUT MATERIALS IN THE PARTS LIST. THE DESCRIPTIONS FOR PN 22 AND PN 23 WILL NOT CHANGE.

21. APPLY HEAT TRACE FROM THE INLET TO PN 32 OF THE VAPOR MIXING SYSTEM (H-14-100280) TO RISER 2 AT GRADE LEVEL AS SHOWN.

- A. USE SELF-REGULATING HEATING CABLE RATED AT 5 WATTS/FOOT.
- B. SPIRAL WRAP THE 2" PIPING/FLEX DUCT WITH 2.4' TO 3' OF HEATING CABLE PER FOOT OF PIPE (2 3/4" TO 3 3/4" PITCH).
- C. USE 18' TO 24' OF HEATING CABLE AROUND THE G1 FILTER HOUSING (4 TO 5 WRAPS). WRAP THE REMAINING HEATING CABLE AROUND RISER 2 DOWN TO GRADE LEVEL AND THE 4" PIPE (ITEM NO 8), AS SHOWN.
- D. USE A POWER CONNECTION KIT TO CONNECT POWER TO THE HEAT TRACE AT THE VAPOR MIXING SYSTEM. USE A CONNECTION KIT WITH PILOT LIGHT TO TERMINATE THE HEAT TRACE CIRCUIT AND INDICATE "ENERGIZED".
- E. MOUNT PILOT LIGHT IN AN EASY TO SEE LOCATION.

22. AFTER INSTALLATION OF THE HEAT TRACE, INSULATE PER THE FOLLOWING INSTRUCTION.

- A. INSULATE THE EXTERIOR OF THE G1 FILTER HOUSING, RISER 2 AND THE 4" PIPE (ITEM NO 8) WITH ARMAFLEX II SHEET INSULATION, 2" THICK.
- B. INSULATE THE PIPING/FLEX DUCT/VALVES FROM THE G1 FILTER HOUSING TO THE INLET TO PN 32 OF THE VAPOR MIXING SYSTEM (H-14-100280) WITH ARMAFLEX II SHEET OR PIPE INSULATION, 1" THICK.
- C. SECURE ALL INSULATION JOINTS WITH ARMSTRONG 520 ADHESIVE. APPLY IN ACCORDANCE TO MANUFACTURER'S RECOMMENDATIONS.
- D. USE ALUMINUM BANDS AS NEEDED TO HOLD THE INSULATION IN PLACE.
- E. FINISH THE WEATHER EXPOSED SURFACE OF ALL INSULATION WITH ARMSTRONG STANDARD WHITE ARMAFLEX FINISH. APPLY IN ACCORDANCE TO MANUFACTURER'S RECOMMENDATIONS.
- F. THE INSULATION SHALL NOT INTERFERE WITH THE REMOVAL OF ACCESS DOORS (G1 FILTER HOUSING) OR THE OPERATION OF VALVES, OR DOP AND SAMPLE PORTS, OR THE MAINTENANCE OF ELECTRICAL EQUIPMENT, OR THE VISIBILITY OF THE HEAT TRACE PILOT LIGHT.

23. NOT USED

24. A-105 ONLY. WRAP FILTER HOUSING WITH TWO HAZARDOUS-LOCATION HEAT BLANKETS (McMASTER-CARR ITEM NO. 3527K11) AND CONTROL WITH HAZARDOUS-LOCATION TEMPERATURE SWITCH (McMASTER-CARR ITEM NO. 5032K85).

TEMPERATURE SWITCH TO BE INSERTED IN PLACE OF THE TEST PORT PLUG (1/2" MPT, TOP-REAR OF HOUSING).

TEMPERATURE TO BE PRE-SET TO 110°F AND ADJUSTED AT ENGINEER'S DISCRETION. TEMPERATURE NOT TO EXCEED 150°F. USE METAL STRAPPING AS NECESSARY TO SECURE FIT. INSTALLATION MAY BE INSULATED PER NOTE 10.

PART NO. 14 MAY BE ORIENTED TO ALLOW INSTALLATION OF TEMPERATURE SWITCH.

25. HEPA FILTERS FOR 0-1 STYLE HOUSINGS SHALL BE FLANDERS 0-007-W-43-05-NU-51-23-CC-FUS A SHALL BE PURCHASED IN ACCORDANCE WITH HNF-S-0552 (CURRENT REVISION). RADIAL STYLE HEPA FILTERS SHALL BE FLANDERS 0-007-1-12-RF-NU-00-E3-ZD4059\* (\* IS A VARIABLE LETTER DESIGNATOR REPRESENTING THE CURRENT VENDOR DRAWING REVISION) AND SHALL BE PURCHASED IN ACCORDANCE WITH RPP-SPEC-28675 (CURRENT REVISION).

26. WELD AND INSPECT PER ANSI B31.3 (LATEST EDITION). VISUAL TEST ALL WELDS FINAL PASS.

27. SAE J429 FASTENERS IN THIS APPLICATION SHALL BE AN EQUIVALENT SUBSTITUTION FOR A307 FASTENERS

28. ORIENT VALVE OPERATOR AS REQUIRED TO AVOID OPERATING INTERFERENCE WITH OTHER COMPONENTS.

29. WOOD AND ECOLOGY APPROVAL REQUIRED PRIOR TO FIELD INSTALLATION OF THIS FILTER.

30. FLANGE BOLTS FOR ASSY 227 ARE BASED ON USE OF A LUGGED BODY BUTTERFLY VALVE. IF A WAFER BODY BUTTERFLY VALVE IS USED THEN EIGHT EACH 5/8-11UNC X 4-3/4" L BOLTS AND NUTS ARE REQUIRED PER MANUFACTURER'S RECOMMENDATIONS.

FOR PARTS LIST SEE SHEETS 1 AND 7



NAME	DATE
RE: DRP	

U.S. DEPARTMENT OF ENERGY  
OFFICE OF RIVER PROTECTION  
PIPING  
AIR FILTER INSTALLATION

# CH2M HILL ENGINEERING CHANGE NOTICE

1a. ECN 725507 R 0

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DM  FM  TM

1b. Proj. ECN N/A - - R

2. Simple Modification <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		3. Design Inputs - For full ECNs, record information on the ECN-1 Form (not required for Simple Modifications)		4. Date 3/28/08	
5. Originator's Name, Organization, MSIN, & Phone No. GJ Gauck, CH2M Hill, S7-24, 373-1779		6. PrHA Number No. PrHA-00193 R - 0 <input type="checkbox"/> N/A	7. USQ Number No. TF - 08 - 0603 - DR - 0 <input type="checkbox"/> N/A	8. Related ECNs ECN-725506	
9. Title 241-SX-113 Replace Filter with Radial Filter Assembly		10. Bldg. / Facility No. 241SX/241-SX-113	11. Equipment / Component ID SX113-WST-FLT-101	12. Approval Designator E	
13. Engineering Documents/Drawings to be Changed (Incl. Sheet & Rev. Nos.) See Block 18		14. Safety Designation <input type="checkbox"/> SC <input type="checkbox"/> SS <input checked="" type="checkbox"/> GS <input type="checkbox"/> N/A		15. Expedited/Off-Shift ECN? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
16a. Work Package Number CLO-WO-08-0564	16b. Modification Work Completed <i>G. Gauck</i> APR 1 2008 4.17.08 Responsible Engineer / Date	16c. Restored to Original Status (TM) N/A STA 3 Responsible Engineer / Date	17. Fabrication Support ECN? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

18. Description of the Change (Use ECN Continuation pages as needed)  
Engineering Document/Drawings to be Changed (continued from Block 13)

H-2-73215 Sh 1, R3

This ECN replaces the breather filter with a radial breather filter assembly.

See page 3 for continuation of description of change

19. Justification of the Change (Use ECN Continuation pages as needed) The old open face breather filter assembly installed on tank 241-SX-113 is being replaced with a new radial filter assembly as requested by Operations.		Engineering Rework <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	20. ECN Category <input type="checkbox"/> Direct Revision <input checked="" type="checkbox"/> Supplemental <input type="checkbox"/> Void/Cancel  ECN Type <input type="checkbox"/> Supersedure <input type="checkbox"/> Revision
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21. Distribution			
Name	MSIN	Name	MSIN
DG Baide	S7-24	M. Fish	S7-24
RP Tucker	S7-83	AD Hjellum	S7-92
J. Inrad	S7-03	SD Doss	S7-03
SD Doss	S7-03		
TR Farris	S7-24		
GJ Gauck	S7-24		
KJ Hull	S7-27		

Release Stamp

DATE: APR 09 2008  
STA: 3  
ID: 18

APR 17 2008  
3 18

CH2M HILL ENGINEERING CHANGE NOTICE

1a. ECN 725507 R 0

Page 2 of 16-6  
4-9-08

DM  FM  TM

1b. Proj. ECN N/A - - R

22. Revisions Planned (Include a brief description of the contents of each revision)  
None

Note: All revisions shall have the approvals of the affected organizations as identified in block 12 "Approval Designator," on page 1 of this ECN.

23. Commercial Grade Item Dedication Numbers (associated with this design change)  
N/A

24. Engineering Data Transmittal Numbers (associated with this design change, e.g., new drawings, new documents)  
N/A

25. Other Non Engineering (not in HDCS) documents that need to be modified due to this change

Type of Document	Document Number	Update Completed On	Responsible Engineer (print/sign and date)
Alarm Response Procedure	N/A	N/A	N/A
Operations Procedure	N/A	N/A	N/A
Maintenance Procedure	3-VB-157SX	will be tracked separately	Greg Gauck 4-17-08
Type of Document	Document Number	Type of Document	Document Number
Env. Spec.	RPP-16922 (pg 54)	N/A	N/A
PM	WT-106315 (New yearly repl)	4-17-08	Greg Gauck 4-17-08
PM	WT-03716 (old BFAT)	4-17-08	Greg Gauck 4-17-08
PM	WT-06800 (old repl)	4-17-08	Greg Gauck 4-17-08

26. Field Change Notice(s) Used?  
 Yes  No  
If Yes, Record Information on the ECN-2 Form, attach form(s), include a description of the interim resolution on ECN Page 1, block 18, and identify permanent changes.

NOTE: ECNs are required to record and approve all FCNs issued. If the FCNs have not changed the original design media then they are just incorporated into the design media via an ECN. If the FCN did change the original design media then the ECN will include the necessary engineering changes to the original design media.

27. Design Verification Required?  
 Yes  No  
If Yes, as a minimum attach the one page checklist from TFC-ENG-DESIGN-P-17.

28. Approvals

Facility/Project Signatures	Date	A/E Signatures	Date
Resp. Engineer GA Gauck <i>[Signature]</i>	4-7-08	Originator/Design Agent	
Resp. Manager DG Baide <i>[Signature]</i>	4-9-08	Professional Engineer	
Quality Assurance		Project Engineer	
IS&H Engineer		Quality Assurance	
NS&L Engineer		Safety	
Environ. Engineer SD Doss <i>[Signature]</i>	4-7-08	Designer	
Engineering Checker TR Farris <i>[Signature]</i>	4-7-08	Environ. Engineer	
Other SX Farm System Engineer M Fish <i>[Signature]</i>	4/7/08	Other	
Other		Other	
Other		DEPARTMENT OF ENERGY / OFFICE OF RIVER PROTECTION	
Other		Signature or a Control Number that tracks the Approval Signature	
Other		ADDITIONAL SIGNATURES	
Other			
Other			

**CH2M HILL ENGINEERING CHANGE NOTICE  
CONTINUATION SHEET**

1a. ECN 725507 R 0

Page 3 of 6

1b. Proj. ECN N/A - - R

Document/Drawing No. N/A

Sheet N/A

Revision N/A

**Description of Change** (Continued from page 1)

**Description of Change** (Continued from page 1)

**PROBLEM:** The 241-SX-113 open face breather filter recently failed aerosol testing. See PER-2008-0597. In response management determined that the filter and housing would be removed and replaced with a radial breather filter assembly.

**ANALYSIS:**

The open face breather filter assembly which does not use a wye assembly is attached to the 12" tank riser (Riser 6) with a 4" to 12" expansion flange.

Per RPP-10906 "Passive Ventilation Breather Assembly Structural Analysis" the loads imposed on a riser from a 4" x 4" x 4" breather filter assembly with a G1 housing for the required seismic and wind loads are:

Dead Load - 480 lbs. Dead load moment - 8450 lbs. Seismic Shear - 216 lbs. Seismic moment - 8125 in\*lbs.  
Seismic Torsion - 3, 805 in\*lbs.

Although no specific structural analysis could be found which supported the installation of the open face housing on tank 241-SX-113 the analysis of breather assembly installations in tanks farms would bound the analysis using an assembly which weighs approximately the same as an open face housing (approx. 62lbs.) and has a better center of gravity i.e., closer to the center of the riser when compared to the installed open face housing

Since the replacement radial breather filter assembly is smaller, lighter, with a better center of gravity, and has less wind surface area than the open breather filter assembly the loads imposed on by this structure on a riser will be significantly less than the loads determined in RPP-10960 and are bounded by this calculation. Since a radial breather filter is bounded by the loads and joint connections in the previous analysis, the 241-SX-113 Riser 6 is adequate to support the loads imposed by the new radial breather filter assembly.

Additionally, the preferred ASME AG-1 compliant radial filter assemblies have been shown to be a good cost effective replacement for the older G-1 filter assemblies.

**SOLUTION:** The breather filter will be replaced with a radial breather filter assembly. Additionally, the wafer style butterfly valve will be replaced with the lug body butterfly valve as shown in the design media H-2-90718 Assy 350.

H-2-73215, Rev. 3, Sht. 1: Change the Riser and Nozzle Schedule on the drawing to show radial breather filter installed on Riser <sup>6</sup>~~18~~ as shown on page <sup>5</sup>~~4~~ of this ECN.

**WORK INSTRUCTIONS:** See specific work package for work instructions.

**POST MAINTENANCE TESTING:** An AG-1 checklist will be completed after installation.

Note: An AutoCAD page may be used in place of this form (the header section items must be included on the AutoCAD page).

CH2M HILL ENGINEERING CHANGE NOTICE  
CONTINUATION SHEET

1a. ECN 725507 R 0

Page 4 of 6  
4.7.08

1b. Proj. ECN NA - R

Document/Drawing No. H-2-73215

Sheet 1

Revision 3

WAS

NOZZLE AND RISER SCHEDULE

NOZZLE NO	SIZE	IDENTIFICATION	REFERENCE AND COMMENTS
241-SX-113-R1	4"	DRAIN IN PUMP PIT	LEAVE "AS IS"
-R2	4"	ENRAF LIT	H-2-817634
-R3	4"	THERMOCOUPLE	LEAVE "AS IS"
-R4	4"	THERMOCOUPLE	REGASKET ACCESS PNL ON TE TERM BOX
-R5	12"	PUMP	LEAVE "AS IS"
-R6	12"	SPARE	INSTALL AIR FILTER PER H-2-69748
-R7	12"	OBSV PORT	SEE DWG H-2-93726 (PROJ B-222)
-R8	12"	AIR LIFT CIRCULATORS	NOTES #7, 12, 13
-R10	6"	TEMP MONITORING SYSTEM	LEAVE "AS IS"
-R11	24"	VAPOR LINE	LEAVE "AS IS"
-R13	42"		LEAVE "AS IS". EXCEEDS 3' BELOW GRADE
PUMP PIT 241-SX-13A			
U-1	3"	NOZZLE LINE NO.113	LEAVE "AS IS" - LINE PLUGGED IN DIVERSION BOX 241-SX-152. SEE H-2-73208
U-2	3"	SPARE NOZZLE	LEAVE "AS IS"
N-1	5"	SPARE NOZZLE	LEAVE "AS IS" - CAPPED
N-2	3 1/2"	INLET	CAPPED IN CAISSON - EXISTING PER H-2-35590
N-3	4"	OVER FLOW	

Note: An AutoCAD page may be used in place of this form (the header section items must be included on the AutoCAD page).

A-6003-563.1 (REV 5)

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CH2M HILL ENGINEERING CHANGE NOTICE  
CONTINUATION SHEET

1a. ECN 725507 R 0

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*H/10/08 J*

1b. Proj. ECN NA - - R

Document/Drawing No. H-2-73215

Sheet 1

Revision 3

IS

NOZZLE AND RISER SCHEDULE

NOZZLE NO	SIZE	IDENTIFICATION	REFERENCE AND COMMENTS
241-SX-113-R1	4"	DRAIN IN PUMP PIT	LEAVE "AS IS"
-R2	4"	ENRAF LIT	H-2-817634
-R3	4"	THERMOCOUPLE	LEAVE "AS IS"
-R4	4"	THERMOCOUPLE	REGASKET ACCESS PNL ON TE TERM BOX
-R5	12"	PUMP	LEAVE "AS IS"
-R6	12"	BREATHER FILTER	H-2-90718, ASSY 350
-R7	12"	OBSV PORT	SEE DWG H-2-93726 (PROJ B-222)
-R8	12"	AIR LIFT CIRCULATORS	NOTES #7, 12, 13
-R10	6"	TEMP MONITORING SYSTEM	LEAVE "AS IS"
-R11	24"	VAPOR LINE	LEAVE "AS IS"
-R13	42"		LEAVE "AS IS". EXCEEDS 3' BELOW GRADE
PUMP PIT 241-SX-13A			
U-1	3"	NOZZLE LINE NO.113	LEAVE "AS IS" - LINE PLUGGED IN DIVERSION BOX 241-SX-152. SEE H-2-73208
U-2	3"	SPARE NOZZLE	LEAVE "AS IS"
N-1	5"	SPARE NOZZLE	LEAVE "AS IS" - CAPPED
N-2	3 1/2"	INLET	CAPPED IN CAISSON - EXISTING PER H-2-35590
N-3	4"	OVER FLOW	

E

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Note: An AutoCAD page may be used in place of this form (the header section items must be included on the AutoCAD page).

A-6003-563.1 (REV 5)

<b>REVIEW COMMENT RECORD (RCR)</b>	1. Date	04/07/2008	2. Review No.	GJG-SX-113-1
	3. Project No.	NA	Page 1 of 1	

5. Document Number(s)/Title(s) ECN-725507- R0, 241-SX-113 Replace Filter with Radial Filter Assembly.	6. Program/Project/Building Number 241-SX	7. Reviewer See Block 13a	8. Organization/Group RC Engineering/COSE	9. Location/Phone 2704-HV, D-111 373-1779
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17. Comment Submittal Approval	10. Agreement With Indicated Comment Disposition(s)	11. CLOSED
<u>NA</u> Date  <u>NA</u> Organization Manager (optional) (print and sign)	See Block 13a Reviewer/Point of Contact (print and sign)  <u>04-07-2008</u> Date GJ Gauck Author/Originator (print and sign)	See Block 13a Reviewer/Point of Contact (print and sign)  <u>04/07/2008</u> Date GJ Gauck Author/Originator (print and sign)

12. Item	13a. Comments			13b. Basis	13c. Recommendation	14. Reviewer Concurrence Required (Y or N)	15. Disposition (provide justification if NOT accepted)	16. Status
1	Name:	Signature:	Date:	NA	No Comment	NA	NA	NA
	S Doss	<i>[Signature]</i>	4-7-08					
	TR Farris	<i>[Signature]</i>	4-9-08					
	M Fish	<i>[Signature]</i>	4/7/08					
	DG Baide	<i>[Signature]</i>	4/9/08					

*[Handwritten mark]*