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July 30, 1999

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PROJECT XL

FIRST ANNUAL PROJECT REPORT

We are pleased to submit the enclosed first Annual Project Report for the Witco OrganoSilicones Group Sistersville Plant's XL Project. Per our agreement with the US Environmental Protection Agency and the WV Division of Environmental Protection, this report is due on July 31, 1999.

Sincerely,

_____

Fred E. Dailey
Plant Manager

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DISTRIBUTION

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Project XL Agreements, Notices & Reports File
Federal Correspondence (letter only)
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FIRST ANNUAL REPORT
FOR THE PERIOD JULY 1, 1998 to JUNE 30, 1999

FOR PROJECT XL AGREEMENT

Between
Witco Corporation OrganoSilicones Group,

U.S. Environmental Protection Agency, and

West Virginia Division of Environmental Protection

STATUS OF THE XL PROJECT

On October 17, 1997, the Final Project Agreement (FPA) for the Witco OrganoSilicones Group XL Project was signed by all parties. On March 30, 1998 Witco and the WV Division of Environmental Protection entered into a Consent Order to implement the provisions of the FPA. On September 15, 1998, EPA published the final rule implementing the FPA from a federal perspective. That Federal Register notice (Volume 63, Number 178, Page 49384) includes a great deal of background on this XL project.

Methanol from the capper unit was first shipped for reuse on October 8, 1997. Methanol reuse under the XL agreement officially commenced on October 27, 1997. Since then, over 730,000 lbs of methanol have been reused.

The Waste Minimization / Pollution Prevention Study Team was formed December 16, 1997. The WM/PP Advisory Committee was formed on December 30, 1997. The study is complete and Witco issued the Final Report on December 11, 1998. Since then, a Plant Pollution Prevention Council has been fostering and monitoring progress.

The thermal oxidizer for the capper unit vents was started up on April 1, 1998. On July 15, 1998 the performance test for the oxidizer was completed. The oxidizer passed all of the performance requirements, and the results were reported to the EPA and DEP. The oxidizer is reducing total organics in the vent stream by 99.99%, versus the 98% minimum required by the Agreement.

ANNUAL REPORT REQUIREMENTS

This annual report must contain information as specified by the Federal Rule [40 CFR 264.1080(f)] implementing this project (as well as the Final Project Agreement, and the corresponding sections of the State Consent Order). Beginning in 1999, on July 31 of each year, the Sistersville Plant shall submit an Annual Project Report to the EPA and WVDEP contacts, with respect to the preceding twelve month period ending on June 30. The following are listed in the order prescribed in paragraphs (f)(2)(viii)(B)(1) through (f)(2)(viii)(B)(8) of this rule.

(1) Instances of operating below the minimum operating temperature established for the thermal incinerator under paragraph (f)(2)(ii)(A)(1) of this section which were not corrected within 24 hours of onset.

July 1 to December 31, 1998	None
January 1 to June 30, 1999	None

(2) Any periods during which the capper unit was being operated to manufacture product while the flow indicator for the vent streams to the thermal incinerator showed no flow.

July 1 to December 31, 1998	93 hours
January 1 to June 30, 1999	12 hours
Total for 12-month period	105 hours
Maximum Allowed per Calendar Year by Rule During Maintenance or Malfunction	240 hours

(3) Any periods during which the capper unit was being operated to manufacture product while the flow indicator for any bypass device on the closed vent system to the thermal incinerator showed flow.

July 1 to December 31, 1998	93 hours
January 1 to June 30, 1999	12 hours
Total for 12-month period	105 hours
Maximum Allowed by Rule per Calendar Year During Maintenance or Malfunction	240 hours

(4) Information required to be reported during that six month period under the preconstruction permit issued under the state permitting program approved under subpart XX of 40 CFR Part 52 Approval and Promulgation of Implementation Plans for West Virginia. [WV Office of Air Quality Regulation 13 Permit]

There is no such information to be reported under the permit.

(5) Any periods during which the capper unit was being operated to manufacture product while the condenser associated with the methanol recovery operation was not in operation.

None.

(6) The amount (in pounds and by month) of methanol collected by the methanol recovery operation.

Month	Methanol Collected by the Methanol Recovery Operation, lbs
July 1998	65,000
August	32,000
September	42,000
October	55,000
November	35,000
December	42,000
January 1999	48,000
February	56,000
March	21,000
April	33,000
May	36,000
June	0
Total for 12 months, July 1998 – June 1999	**465,000**

The above values are calculated from the total methanol collected for the year times the portion of methanol generated (see Item 8, below) in each given month. The numbers for the first six months differ somewhat from those calculated and reported previously, because they have been calculated and apportioned over the twelve month period.

(7) The amount (in pounds and by month) of collected methanol utilized for reuse, recovery, thermal recovery/treatment, or bio treatment, respectively, during the six month period.

	Collected Methanol Destination, lbs		
Month	**Reuse**	**Thermal Recovery / Treatment**	**Bio-treatment**
October – December 1997	76,620	0	0
January – June 1998	191,074	0	0
July 1998	0	0	0
August	39,520	0	0
September	35,920	0	0
October	40,020	0	0
November	117,720	0	0
December	0	0	0

	Collected Methanol Destination, lbs		
Month	**Reuse**	**Thermal Recovery / Treatment**	**Bio-treatment**
January 1999	39,820	0	0
February	39,900	0	0
March	114,000	0	0
April	0	0	0
May	38,420	0	0
June	0	0	0
Total for 12 months, July 1998 – June 1999	**465,320**	0	0
Total Since Commencement of Reuse	**733,014**	0	0

We have thus met the Performance Standard that, "on an annual basis, the Sistersville Plant shall ensure that a minimum of 95% by weight of the methanol collected by the methanol recovery operation (also referred to as the "collected methanol") is utilized for reuse, recovery, or thermal recovery/treatment." [40 CFR 264.1080(f)(2)(v)(A)] In fact, 100% has been reused.

(8) The calculated amount (in pounds and by month) of methanol generated by operating the capper unit.

Month	**Methanol Generated by the Capper Unit, Calculated, lbs**
July 1998	86,545
August	42,294
September	56,814
October	73,890
November	47,461
December	56,358
January 1999	63,795
February	75,772
March	28,267
April	44,810
May	48,009
June	0
Total for 12 months, July 1998 – June 1999	**624,016**

As discussed in the Final Project Agreement, a portion of the methanol generated in the capper unit cannot be economically collected, but rather

goes to the onsite waste water treatment unit via a steam ejector, or to the thermal oxidizer. This is the difference between the methanol generated [Item (B)(8)] and collected [Item (B)(6)].

The following are listed in the order prescribed in paragraphs (f)(2)(viii)(C)(2) through (f)(2)(viii)(C)(8) of the final rule.

(9) An updated Emissions Analysis for January through December of the preceding year.

Table 1 shows the details of emissions and waste reductions achieved by Project XL for calendar year 1998, summarized as:

Air Emissions Reductions	152,217 lbs
Wastewater Treatment Sludge Reductions	542,783 lbs
Methanol Reused	424,254 lbs
TOTAL REDUCTIONS IN EMSSIONS AND WASTE	1,119,254 lbs

(10) Discussion of the Sistersville Plant's performance in meeting the requirements of the final federal rule (as well as the XL agreement, and state consent order), specifically identifying any areas in which the Sistersville Plant either exceeded or failed to achieve any such standard.

The Sistersville Plant is required to, by specified deadlines:

- **install a thermal oxidizer and route the process vents from its polyether methyl capper (``capper'') unit to that oxidizer for control of organic air emissions; conduct a performance test of the oxidizer, and verify that the oxidizer reduces the total organic compounds (``TOC'') from the process vent streams by at least 98 per cent; comply with specific monitoring and recordkeeping requirements;**

- **implement a methanol recovery operation; ensure that a minimum of 95% by weight of the methanol collected by the methanol recovery operation (also referred to as the ``collected methanol'') is utilized for reuse, recovery, or thermal recovery/treatment, as defined in the rule; comply with specific monitoring and recordkeeping requirements; and**

- **implement a waste minimization/pollution prevention (``WMPP'') project, including establish an Advisory Committee and Study Team, conduct a WMPP Study, issue a Final WMPP Study Report, and make reasonable efforts to implement all feasible (as defined in the rule) WMPP opportunities in accordance with the priorities identified in the implementation schedule.**

All of these requirements have been met, by the deadlines specified. The 98% oxidizer control efficiency requirement has been exceeded, as the performance test showed a 99.99% control. The 95% methanol reuse, recovery, or thermal recovery/treatment has been exceeded, as 100% of the methanol collected has been reused. The WMPP efforts are discussed further, below.

(11) A description of any unanticipated problems in implementing the XL Project and any steps taken to resolve them.

The Sistersville Plant encountered a number of mechanical difficulties in the shake down of the thermal oxidizer. That, combined with severe weather, forced the Plant to request an extension of the originally proposed 60-day deadline for the oxidizer performance test. EPA and WVDEP both granted the extension, setting the test deadline at 120 days after oxidizer startup. That deadline was met.

No other unanticipated problems have occurred.

(12) A WMPP Implementation Report that contains the following information:

- **(i) A summary of the WMPP opportunities selected for implementation;**
- **(ii) A description of the WMPP opportunities initiated and/or completed;**
- **(iii) Reductions in volume of waste generated and amounts of each constituent reduced in wastes including any constituents identified in paragraph (f)(8) of the final rule [this is a list of particular hazardous constituents which might be found at the Sistersville Plant];**
- **(iv) An economic benefits analysis;**
- **(v) A summary of the results of the Advisory Committee's review of implemented WMPP opportunities;**
- **(vi) A reevaluation of WMPP opportunities previously determined to be infeasible by the Sistersville Plant but which had potential for future feasibility.**

In January 1999, the Sistersville Plant's Pollution Prevention (“P2”) Council met for the first time. This Council was established in December 1998 as a result of the WM/PP study. The Council has met monthly since then. Having established the Council, we have proceeded to implement many of the recommendations of the WMPP Study, as documented in the Final Report.

Foremost was to pursue full implementation of the recently identified P2 opportunities. Council members chose the most promising opportunities from those identified in the Final Report, including those originally deemed infeasible, as well as offering other ideas. The Council maintains an “evergreen” list of ideas, which are

reviewed at each monthly meeting, to report progress and foster cooperation among the various functions of the plant. Natural teams have surfaced to pursue these priority opportunities. To date, 350 P2 opportunities have been identified.

This approach has been quite successful. Table 2 lists all the WMPP opportunities that, with the P2 Council's encouragement, are currently In-Progress or have been put In-Place during the preceding twelve month period ending on June 30. For each opportunity, Table 2 gives the particular Waste & Emission, the opportunity itself, its implementation stage, status details, and the potential cost savings and waste/emission quantity savings.

The cost savings and waste reductions are summarized:

		Potential Cost $$ Savings *	**Potential Waste/Emission Reductions**
Expected Recurring Savings	XL Project Air Emissions Reduction and Methanol Recycle (Excludes capital savings from XL project) Actual for Calendar Year 1998	$16,000/yr	1,100,000 lbs/yr
	Other P2 Opportunities In-Progress or Put In-Place July 1, 1998 – June 30, 1999	$620,000/yr	730,000 lbs/yr
	TOTAL	$640,000/yr	1,800,000 lbs/yr

* Note that these savings do not consider the expense of implementing them. Hence net savings will be less. It is often difficult to assign that expense. For example, a totally new process unit may cost millions of dollars to construct. If that new process produces less waste, how much of the design and construction expense ought to be assigned to the p2 benefits? In the case of a process change being done explicitly for p2 reasons, the expense is more easily determined.

The Council has been utilizing the periodic plant newsletter to promote and publicize P2 efforts. Council members are from each plant department, and communicate progress by word of mouth. Council members developed a list of other communication tools which will be occasionally reviewed to work toward implementing. We feel that P2 awareness has been raised among the plant employees, though we can and must do even better.

Table 2 also indicates whether the various P2 options have an impact on the Sistersville Plant's generation of some hazardous constituents listed in the XL final federal rule. One option concerns a nickel containing filter cake. Nickel is the only chemical on a new list of Persistent, Bioaccumulative, and Toxic materials that EPA published on November 9, 1998. All other P2 options listed in Table 2 as dealing with hazardous constituents relate to reducing the plants' use of solvents, specifically toluene and methanol.

(13) An assessment of the nature of, and the successes or problems associated with, the Sistersville Plant's interaction with the federal and state agencies under the Project.

Over the past year Sistersville personnel have participated in several conference calls to discuss experiences with the XL process. These calls were sponsored by either the USEPA or industry groups. Feedback on the successes and problems were given during these calls, the work product of which were all communicated to EPA in some means. In general, the Sistersville project has experienced few problems in the past 12 months. There were some issues during the drafting and implementation of the site-specific rule which involved an attempt to deviate from the agreed upon language contained in the FPA.

A second XL project was identified and successfully implemented by a separate company in West Virginia. It is unknown what impact the success of the Sistersville project had with this but is likely that the Project "opened the door" for the second project due to the State''s familiarity with the process.

At EPA's request, Sistersville personnel made a presentation on the Project in May 1999 to other potential project sponsors. This was done as part of EPA's marketing campaign for Project XL.

(14) An update on stakeholder involvement efforts

Stakeholder involvement efforts in the past 12 months include:

- An update was sent to everyone on the Sistersville Project XL mailing list in October 1998 listing the various milestones achieved between July and October 1998.
- A copy of the semi-annual report was sent to everyone on the Sistersville Project XL mailing list in January 1999.
- As a result of the semi-annual report, an article was published in the February 10, 1999 issue of the Wheeling News-Register providing an update on the Project to the public.
- At EPA's request, Sistersville personnel made a presentation on the Project in May 1999 to other potential project sponsors.
- Over the past year Sistersville personnel have participated in several conference calls sponsored by EPA or industry groups to discuss experiences with the XL process.

(15) An evaluation of the Project as implemented against the Project XL Criteria and the baseline scenario.

The baseline scenario evaluation is demonstrated with Table 1. Following is an evaluation against Project XL criteria.

1. Environmental Results

   The Project has provided superior environmental benefit through reduced air emissions, reduced sludge generation and recycling of a beneficial byproduct (see Table 1). In addition, there have been several other WM/PP projects implemented which are providing additional environmental benefits (see Table 2).

2. Cost Savings and Paperwork Reduction

   It is estimated the capital deferral from this project will result in capital savings of approximately $700,000 over the life of the project. It is estimated that there are additional cost savings of over $600,000 per year for implementation of other WM/PP projects.

   Paperwork reductions can only be claimed for deferral of any permitting or reporting requirements that may have been associated with closure of the surface impoundments and replacement with tanks. There has likely been a net increase in paperwork requirements when one takes into consideration the amount of paperwork required to obtain the Project and reporting requirements as a result of the project

3. Stakeholder Support

   Local communities and local agencies have fully supported the project.

4. Innovation/Multimedia Pollution Prevention

   The project results in multimedia pollution prevention through air emission, solid waste and water pollutant reductions (see Table 1). Several innovative ideas are being explored as part of the WM/PP study.

5. Transferability

   It does not appear that the basis of the project (voluntary control of emissions in exchange for regulatory relief) has been "transferred" to other projects or facilities. However, it is our understanding that the idea of site wide WM/PP study has been incorporated into other Project XL FPA's. It is also our understanding that the OSi FPA is being used as the model for other FPA's.

6. Feasibility

   All requirements of the FPA have been met therefore the feasibility has been proven.

7. Monitoring, Reporting and Evaluation

   The FPA and site specific rule clearly spell out the monitoring, reporting and evaluations associated with the Project.

8. Shifting of Risk Burden

   Both prior and subsequent to the Project, emissions from the wastewater system, hazardous waste tanks and process units are not considered to have an adverse impact on employee health as substantiated by industrial hygiene testing. There has been no shifting of risk burden. This is further substantiated through the overall decrease in air emissions.

CONCLUSION

Witco's XL Project has been very successful thus far. We have met all of our requirements, produced the intended superior environmental performance, and have received the temporary deferral from certain regulations. The Project is demonstrating an alternative to previously existing regulations and yielding cost savings to the company.

Please contact Okey Tucker of the Witco Sistersville Plant (304-652-8131) for further information.

TABLE 1 EMISSIONS SUMMARY

	Constituent	1995 Baseline (lb/yr)	1998 Actual (lb/yr)	1998 If XL Project had not been implemented	Reductions in 1998 Due to Project XL(Note Oxidizer Started up 4/1/98)
Capper Air Emissions	Methyl Chloride	220,000	34,522	108,025	73,503
	Methanol	57,000	13,201	42,499	29,298
	Dimethyl Ether (see note 1)	-	12,175	38,001	25,826
	Subtotal Capper	***277,000***	***59,898***	***188,525***	***128,627***
Wastewater Treatment Unit (WWTU) Air Emissions					
Surface Impoundments (SI)	Methyl Chloride	590	2,514	2,514	-
	Methanol	8,420	6,481	23,881	17,400
	Dimethyl Ether (see note 1)	9,950	-	-	-
	Ethyl Chloride	2,990	9,682	9,682	-
	Toluene	17,890	9,600	9,600	-
	Other VOC's	7,530	3,999	3,999	-
	Total SI	47,370	32,276	49,676	17,400
Collection system and tanks	Methyl Chloride	1,430	2,689	2,689	-
	Methanol	3,150	2,489	8,679	6,190
	Dimethyl Ether (see note 1)	28,340	-	-	-
	Ethyl Chloride	12,070	24,832	24,832	-
	Toluene	44,840	24,520	24,520	-
	Other VOC's	3,100	2,126	2,126	-
	Total Other WWTU	92,930	56,656	62,846	6,190
	Subtotal WWTU	***140,300***	***88,932***	***112,522***	***23,590***
	Total Air Emissions	***417,300***	***148,830***	***301,047***	***152,217***
Capper Discharges to WWTU (lb/yr)	Methyl Chloride	1,000	-	-	
	Methanol (from scrubber)	380,000	170,884	170,884	-
	Methanol (from condenser) see note 2	350,000	80,654	424,254	343,600
	Dimethyl Ether (see note 1)	51,000	-	-	-
	Acetic Acid	8,000	19,542	19,542	
	Total Organic	***790,000***	***271,080***	***614,680***	***343,600***
Waste reuse (lb/yr)	Methanol	**-**	**424.254**	**-**	**424.254**
Sludge Generation due to Capper Operation		***1,177,300***	***420,053***	***962,836***	***542,783***
Total Reductions due to Project = Air Emissions Reduction + Sludge Reductions + Methanol Reuse					***1,119,254***

1 - Since 1995 the dimethyl ether has been diverted from the wastewater system to the oxidizer
2 - 1998 value is volume reused for biomass feed in on-site wastewater treatment unit -- this is reuse per the XL Agreement

TABLE 1 EMISSIONS SUMMARY

Emission Calculations Basis (all data are engineering estimates)
 # Volume reused for biomass feed in on-site wastewater treatment unit -- this is reuse per the XL Agreement

Capper Air Emissions	WV Air Emissions Inventory reported values calculated from known production rates and raw material balance.
WWTU Air Emissions	EPA's Water 8 model used to estimate loss from collection system and WWTU (inground tanks and surface impoundments). Influent concentrations calculated from known discharges to process sewer.
Capper discharges to WWTU	Raw material balance and stoichiometric ratios used to calculate amount generated by capper
Waste Reuse(Methanol)	Raw material balance and stoichiometric ratios used to calculate amount generated by capper and actual collected amounts.
Sludge Generation	Calculated using WWTU loading, loss to air and biodegradability factors.

TABLE 2. POLLUTION PREVENTION OPTIONS IN PROGRESS or IN PLACE

ID	Wastes & Emissions ---- XL	P2 Options -- XL	Implementation Stage	Status Details -- XL	Potential Cost Savings Neglecting Expense of Implementing Option -- XL $/year	Potential Waste/Emission Quantity Reductions -- XL lbs/year	Hazardous Constituents per XL Rule?
31	Buckets & Lab Samples	Ask ourselves "Are we sampling too often and / or too much volume"	1-Scoping	Sample and analysis team formed to improve practices and efficiency	---	---	N
320	Buckets & Lab Samples	Distribution sampling -- reduce number, reduce taking to lab	1-Scoping	Sample and analysis team formed to improve practices and efficiency	---	---	N
34	Buckets & Lab Samples	Examine QC program to see if can reduce sampling effort	1-Scoping	Sample and analysis team formed to improve practices and efficiency	---	---	N
40	Buckets & Lab Samples	One sample to all labs	1-Scoping	Sample and analysis team formed to improve practices and efficiency	---	---	N
41	Buckets & Lab Samples	Operators run analysis on some samples in area	1-Scoping	Sample and analysis team formed to improve practices and efficiency	---	---	N
43	Buckets & Lab Samples	Smaller samples -- 4 oz. or less	1-Scoping	Sample and analysis team formed to improve practices and efficiency	---	---	N
331	Drums	Bulk storage examine -- Process X	1-Scoping	Investigating making product to a tank or tote, instead of drums			N
313	Drums	Bulk storage examine -- Process Y: Use raw material from tank in place of some other raw material in drums	6-In-place & On-going	Practice is in place. 3/1/99	$2,700	3,600	N
325	Drums	Drumfilling -- flush Product A to bulk container instead of drums	1-Scoping	Considering and looking for available dumpster or tote; considering logistics.	---	---	N
324	Drums	Drumfilling -- flush Product Y through new lines back to crude tanks	1-Scoping	Considering and looking at economics of adding a line.	---	---	N
307	Drums	Drumfilling and line flushing better methods in Poly II Drumfilling	4-Evaluating	Lines and meters installed to allow flushes to go directly to waste solvent tanks, avoid using drums. This is complete. 3/5/99 Drumfilling procedures in Poly II are being revised to reduce the amounts flushed to waste before drumming. Incomplete 7/99	$41,000	54,000	N
312	Drums	Drumfilling and line flushing better methods in Poly II	3-Implementing	Equipment purchased, installation incomplete. 7/99	$6,100	4,100	N

TABLE 2. POLLUTION PREVENTION OPTIONS IN PROGRESS or IN PLACE

ID	Wastes & Emissions ---- XL	P2 Options -- XL	Implementation Stage	Status Details -- XL	Potential Cost Savings Neglecting Expense of Implementing Option -- XL $/year	Potential Waste/Emission Quantity Reductions -- XL lbs/year	Hazardous Constituents per XL Rule?
		Drumfilling -- Product Z					
341	Drums	Emptying drums completely	6-In-place & On-going	Plant departments have been reminded to completely empty drums before sending to EP.	---	---	N
63	Drums	Install line from Poly 1 to Poly 2 for Product AA	3-Implementing	Equipment and piping installation is complete. Need to complete safety reviews.	---	---	N
58	Drums	Raw material drums with deposit – actually return, not send to EP	6-In-place & On-going	Practices for emptying, preparing, collecting, and returning recyclable drums and carboys have been revamped and improved. This should guarantee that no returnable drums are disposed. Nine different raw materials are received in returnable drums or carboys.	---	---	N
70	Drums	Raw materials buy in bulk/totes instead of drums	1-Scoping	Looking into data on raw materials purchased for opportunities to buy in bulk.	---	---	N
81	Drums	Totes: recycle one-way totes via tote supplier	6-In-place & On-going	We are returning one-way totes from plant and from some customers.	$100,000	180,000	N
308	Drums #1 Product	Drumfilling and line flushing better methods in Poly II Drumfilling	3-Implementing	Partials avoidance, by not taking dedicated tanks to blow-by, practice is in place, as of 3/99.	$200,000	120,000	N
334	Electricity	Pumps running needlessly - info from SAP	1-Scoping	Working on ways to monitor pump running times through computer. This can lead to shutting down pumps when they need not be running.	---	---	N
293	Filtercakes	New Process BB	3-Implementing	New process being installed. Will use cartridge filter instead of a filter press, generating less waste.	---	---	N
124	Flushes, Process and Samples	Sampling setups / procedures - improve e.g. in line samplers for rail unloading	2-Planning	Planning and investigating purchasing sampling valves to minimize wastes.	---	---	N
295	HCl	Recover and sell by-product from	1-Scoping	Awaiting approvals for expense for a	---	---	N

TABLE 2. POLLUTION PREVENTION OPTIONS IN PROGRESS or IN PLACE

ID	Wastes & Emissions ---- XL	P2 Options -- XL	Implementation Stage	Status Details -- XL	Potential Cost Savings Neglecting Expense of Implementing Option -- XL $/year	Potential Waste/Emission Quantity Reductions -- XL lbs/year	Hazardous Constituents per XL Rule?
		Process CC		demonstration unit.			
128	Hoses	Inspect and re-certify instead of disposing?	1-Scoping	Team is looking into how to test hoses, to prevent discarding good ones.	---	---	N
297	MeCl, CFC emissions	New Poly I / NPD Refrigeration Unit	3-Implementing	Installation in progress. 7/99	---	---	Y
345	Oil Sheens	Filter cake absorbent - more efficient	1-Scoping	Different absorbent material has been ordered and will be tested. Twice as effective, overall cost less. Less waste material would go to landfill. If it works OK, will look for other applications in the plant (e.g. floor absorbents).	---	---	N
268	Oil Sheens	Oil in WWTU - Plant wide use of PetroGuard absorbent	6-In-place & On-going	Study shows that PetroGuard Lite booms are very effective for both silicone and mineral oil absorption, with no later release of the oils to the environment. Recommended for use in critical areas handling oils.	---	---	N
321	Oil Sheens	Pumps leaking silicone oil -- replace in Poly I	2-Planning	Project on hold.	---	---	N
177	Pallets	Reusable plastic pallets for drum flusher -- eliminate disposing 2,000 wooden pallets per year	6-In-place & On-going	Plastic pallets have been put in service 10/98. These can be reused many times in the drum flusher, and prevent wooden ones from being contaminated by wastewater, and disposed in landfill.	$24,000	200,000	N
347	Process T	By-product recover and sell	1-Scoping	Need a representative sample to send to the potential buyer, who has been identified.	---	---	N
310	Process U	New process: reduce lights, wastes, improve efficiencies	1-Scoping	R&D program to evaluate continuous process in pilot unit. Applicable to many plant processes.	---	---	N
190	Process Water Use	Cooling towers -- review operation of : e.g. fans need not	3-Implementing	Operators now monitor cooling towers weekly. Cooling towers are now to be	---	---	N

TABLE 2. POLLUTION PREVENTION OPTIONS IN PROGRESS or IN PLACE

ID	Wastes & Emissions ---- XL	P2 Options -- XL	Implementation Stage	Status Details -- XL	Potential Cost Savings Neglecting Expense of Implementing Option -- XL $/year	Potential Waste/Emission Quantity Reductions -- XL lbs/year	Hazardous Constituents per XL Rule?
		run in winter; algae growth in some of them		cleaned annually. Some scheduled for July and August.			
315	Process Water Use	Programmatic water conservation -- computer model water distribution system to help understand causes and effects	3-Implementing	Project begun to model the process water supply system, to allow understanding and improving its performance and efficiency.	---	---	N
208	Process Water Use	Scrubbers - improve design	1-Scoping	May be addressed with water distribution modeling project. [ID 315]	---	---	N
342	Process Water Use	Scrubbers - increase number on recycle water	1-Scoping	May be addressed with water distribution modeling project. [ID 315]	---	---	N
209	Process Water Use	Solids in process water: Set up plant multi-functional team to review process, including sources and how to handle	0-Inactive	Looking at better formalizing ways to recognize and identify foreign material.	---	---	N
4	Product A	Nickel Catalyst recovery	1-Scoping	Funding for pilot unit has been approved and Purchase Order issued.	---	---	Y
12	Product C	Installing pump for material EE instead of nitrogen transfers to avoid need for degassing and reduce vents	6-In-place & On-going	Pumps are installed and the degassers have been removed.	---	---	N
296	Product K	New process	3-Implementing	Startup of process begun 6/99.	$200,000	37,000	N
277	Product L	Heavies recycle; run next batch "on top" of previous batch's heavies	6-In-place & On-going	Implemented 2/99.	$22,000	8,000	N
216	Product M	Alcohol wastewater treat instead of burn	1-Scoping	Lights to be analyzed.	---	---	N
217	Product M	Recover the alcohol if possible and reuse or sell	1-Scoping	Lights to be analyzed.	---	---	N
302	Product O	By product uses as products	1-Scoping	Ongoing research to develop uses of by-product.	---	---	N
301	Product O	New process	2-Planning	Design of new more efficient process underway.	---	---	N
306	Product Q	Process Improvements	1-Scoping	R&D work continuing, looking at	---	---	N

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				different synthesis route			
290	Product S Air Emissions	New process unit	3-Implementing	New process being installed. Will generate less emissions.	---	---	N
349	Tanks	Transfers of materials -- study root causes of mistransfers which lead to wastes	3-Implementing	Team studied and developed improved procedures and counter measures to prevent mistransfers.	---	---	Y
234	Utility Use	Steam trap program -- improve?	1-Scoping	New type of steam trap identified. Promises less maintenance cost, less steam loss.	---	---	N
343	Waste Solvents	Cleanup Accounting - how best to assign costs of cleanups to products	1-Scoping	The best way of charging the cost of cleanup (previous product, following product, both?) is being considered.	---	---	Y
319	Waste Solvents	Drumfilling line flushes minimize -- Poly I identify dedicated lines	6-In-place & On-going	Practice is in place. By tagging lines with last product, can avoid cleanups when the same product is drummed twice in a row.	$3,200	13,000	Y
303	Waste Solvents	New process using less solvent	3-Implementing	Installation of process in progress.	---	---	Y
337	Waste Solvents	Novel solvent to dissolve silicones -- plantwide applications	1-Scoping	Evaluating novel solvent for cleaning and maintaining equipment. Can be more effective, using less solvent.	---	---	Y
330	Waste Solvents	Process FF Cleanups reduce solvent usage	6-In-place & On-going	Use spray nozzles for cleaning instead of boiling solvent. Reduced amount of solvent and time for cleaning.	$25,000	100,000	Y
340	Waste Solvents	Process GG -- Revise cleanup procedures to reduce use of solvent and time to achieve acceptable cleanup	6-In-place & On-going	The clean-up procedure was modified to measure contaminant directly, rather than an indirect measure. Reduced clean-up time and solvents greatly.	---	---	N
258	Waste Solvents	Product sequencing - improve for P2	3-Implementing	Develop desired product sequencing to minimize cleanups and maximize capacity. Routinely use proper product sequencing when scheduling, thus reducing waste.	---	---	Y
259	Waste Solvents	Reclaim / reuse; recover solvent	1-Scoping	Working to develop work practices and	---	---	N

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		off-site		equipment setup to help assure the quality of waste alcohol so that it may be recycled.			
260	Waste Solvents	Reuse of solvents -- last pass clean-up used for first pass on next batch / campaign	4-Evaluating	Need to improve piping arrangements to allow reuse of solvent.	$600	6,000	Y
336	Waste Solvents	Revise system to replace hoses with hard pipe and block valves, thus reducing cleanup of hoses	2-Planning	Design work partially complete.	---	---	Y
305	Waste Solvents	Solventless Copolymers	6-In-place & On-going	More products switched to solventless	---	---	Y
316	Waste Solvents	Toluene for Poly II -- use from railcar delivery system, instead of trailers	1-Scoping	Currently Poly II uses toluene from trailers. Installing piping would save cleanup of trailers, extra vents from trailers, lost material in trailers, cheaper toluene by railcar, save people's time and equipment downtime awaiting transfers.	---	---	Y