ENGINEERS

1720 Walton Road, Blue Bell, PA 19422 610-828-3078 Fax 610-828-7842

INSPECTION & MONITORING PLAN

150-GALLON HAZARDOUS WASTE STORAGE TANK
BUILDING 4

GLAXOSMITHKLINE, LLC
UPPER MERION CAMPUS

(RCRA Subpart CC and Other Regulations)

Prepared by:

IES ENGINEERS
Blue Bell, Pennsylvania

IES PROJECT NO. EV130101.01

APRIL 2013

ENGINEERS

1.0 GENERAL

GlaxoSmithKline, LLC (GSK) operates an unheated, 150-gallon atmospheric, aboveground, fixed roof, single-walled horizontal storage tank in Building 4 at the Upper Merion (UM) Campus to collect solvent waste from the necropsy laboratory. This tank, which was manufactured by Highland Tank and Manufacturing Company, is constructed of 304 Stainless Steel. It is two feet six inches in diameter by four feet long. The average volatile organic concentration in the tank is more than 500 ppmw. The UM site is classified as a Large Quantity Generator of Hazardous Waste (LQG) and stores waste for less than 90 days before disposing of it. This tank is not used for waste stabilization.

Since the UM site is a LQG and since the average volatile organic concentration of the waste in the 150-gallon tank is greater than 500 ppmw, GSK is required to comply with the RCRA Subpart CC regulations codified in 40 CFR §265.1085. This tank uses fixed roof Level 1 controls. In addition, these regulations also require GSK to develop and implement a written plan and schedule to perform tank inspections and monitoring at least once a year. This written plan is being prepared to satisfy the Subpart CC inspection requirements.

2.0 INSPECTION & MONITORING PLAN

1) Update the waste characterization, including the volatile organic concentration of the waste stream along with its maximum vapor pressure, whenever there is a change in the process generating the waste or at least once every 12 months, whichever comes first. The determination can be made either by direct measurement or knowledge of the waste.

2) Based on the waste characterization, ensure that the Level 1 controls are still applicable since they are dependent upon the maximum vapor pressure of the waste stream as shown in attached Table 1.

3) Perform a visual inspection of the tank to ensure that:

   - There are no cracks, holes, gaps, or any open spaces.
   - There are no broken, cracked, or damaged seals or gaskets on the closure devices.
   - All openings are equipped with closure devices such as conservation vents, pressure relief valves, caps, etc.
   - There has been no corrosion attack on the tank or its appurtenances.

   During the inspection, the inspector must note any defects on the inspection form. Corrective actions are to be made promptly, i.e., first repairs must be made within 5 calendar days of detection and completed within 45 days of detection. If defects cannot be corrected within the allowable timeframe, the reason(s) must be noted on the inspection form and a corrective action plan developed. Attached is a copy of a Subpart CC inspection form that must be completed, along with the name of the inspector, date and time of inspection, and other findings.

3.0 RECORDS

GSK must keep the waste characterization and inspection records on site for at least three years from the date of the inspection or characterization. These records must be presented to the EPA or the Department upon request.

4.0 SCHEDULE

GSK must perform the Subpart CC tank inspection at least once every 12 months.

5.0 OTHER RCRA INSPECTION REQUIREMENTS

Large Quantity Generators are also required to inspect their tanks each operating day waste is in the tank in accordance with §265.195. These visual inspections need to include the following:

- A visual inspection that the tank is labeled with the words "Hazardous Waste."
- A visual inspection to ensure there are no signs of a release in the nearby area.
- A visual inspection of all the surfaces of the tank to ensure that there are no leakages, cracks, holes, or sources of corrosion.
- A visual inspection of the overfill spill control equipment (i.e., waste feed cut-off system(s), bypass systems, and drainage systems) to ensure that the tank is in good working order.
- A visual inspection that there is a label clearly showing the first date of waste accumulation for the current 90-day cycle.
- A visual inspection that there is a label(s) indicating the type(s) of waste being stored - ignitable, corrosive, reactive, and/or toxicity - in accordance with §265.194.

Records of these daily inspections must be maintained at the site for three years from the inspection date in accordance with §265.15(d).

Table 1
Determination of Applicable Level of Control for
Tanks Containing Hazardous Waste Subject to Subpart CC Regulations

Tank Design Capacity	Maximum Organic Vapor Pressure of Hazardous Waste in Tank	Does Waste Stabilization Occur in Tank?	Level of Control
< 75 m^3 (approx. 20,000 gals.)	≤76.6 kPa (approx. 11.1 psi or 574 mm Hg)	Yes No	Level 2 Level 1
	>76.6 kPa	Yes No	Level 2 Level 2
≥75 m^3 and <151 m^3 (approx. 40,000 gals.)	≤27.6 kPa (approx. 4.0 psi or 207 mm Hg)	Yes No	Level 2 Level 1
	>27.6 kPa	Yes No	Level 2 Level 2
≥151 m^3 (approx. 40,000 gals)	≤5.2kPa (approx. 0.75 psi or 239 mm Hg)	Yes No	Level 2 Level 1
	>5.2 kPa	Yes No	Level 2 Level 2

Table 3

GSK, Upper Merion, PA
Vapor Pressure Calculation In Tank - Building 4/150 gal

The tank is an aqueous mixture of a number of compounds.

VOC content was measured at		2,300	mg/kg
Assume this material is ethanol	MW =	46	
And the balance is water	MW =	18	

The mol fraction in the water is then 0.0901%

Raoult's law allows an estimate of the total pressure of the mixture, depending on the mol fraction of each material in the mixture, and its vapor pressure.

$P_T = P^*_1 x_1 + P^*_2 x_2 \ldots$

Where PT = total pressure

P^*_i = Pressure of the pure substance at the temperature

x_i = mol fraction of the substance in the mixture

Calculate pressure of a pure substance per Antoine's equation below

Assume a temperature	20	30	40	C
	293.15	303.15	313.15	K
P	0.054	0.098	0.168	Bar
P	0.784	1.415	2.437	psia
	40.5242	73.1668	126.0358	mmhg
P_{eth} in mixture is then	0.0007	0.0013	0.0022	psia
	0.0365	0.0659	0.1136	mmhg

Antoines: $Log_{10}(P) = A-(B/(T+C))$

Where: P: Bar, T: K

Antoines parameters	A	B	C
Ethanol	4.92531	1432.526	-61.819

ATTACHMENT A

TABLES, DIAGRAMS, AND DRAWINGS

Subpart BB

A/B/D

Attachment 1

IES Letter Dated February 25, 2013
Subpart BB Air Emissions Compliance for Equipment Leaks
Building 4 Hazardous Waste Operations

ENGINEERS

1720 Walton Road, Blue Bell, PA 19422 610-828-3078 Fax 610-828-7842

February 25, 2013

E-MAIL
Ms. Deanna Herman
Environmental Manager
GlaxoSmithKline, LLC
1250 South Collegeville Road
P.O. Box 5089
Collegeville, PA 19426-0989

Subject: Subpart BB Air Emissions Compliance for Equipment Leaks
Building 4 – Hazardous Waste Operations
Upper Merion Campus
IES Project No. EV130101.01

Dear Deanna:

IES Engineers (IES) is pleased to provide you with the results of the assessment related to the applicability of 40 CFR Part 265 Subpart BB to the piping system component leakage associated with the 150-gallon indoor hazardous waste storage tank located on the second floor of Building 4 at the Upper Merion Campus.

1.0 Project Background

GlaxoSmithKline, LLC (GSK) operates a necropsy laboratory in Building 4 at the Upper Merion Campus. Hazardous waste generated from the laboratory sink operations is pumped to the second floor 150-gallon aboveground storage tank that is gravity-drained to a 55-gallon drum for off-site disposal. This hazardous waste consists mainly of ethanol, acetic acid, glycerin, potassium hydroxide, and water. The 150-gallon AST is regulated under the Subpart CC regulations, which requires Level 1 controls. IES submitted its regulatory analysis of this tank during December 2012.

This report addresses the applicability of the Subpart BB requirements to the piping system components connecting the twelve lab sinks to the 150-gallon tank and the drain piping from the 150-gallon tank to the 55-gallon drum. In addition, IES evaluated the compliance status of the 55-gallon drum under the Subpart CC requirements in order to complete the evaluation of the entire system.

2.0 Regulatory Analysis

The Subpart BB standard became effective on December 21, 1990, and addresses the control of volatile organic emissions from Large Quantity Generators (LQGs) of Hazardous Waste and Treatment, Storage and Disposal Facilities (TSDFs), which use equipment that contains or contacts

hazardous wastes with organic concentrations of at least 10 percent by weight. Existing facilities were required to identify and tag the equipment and implement a leak detection and repair (LDAR) program by December 6, 1996, while new facilities are required to implement the LDAR program or have air emission controls in-place and operational prior to waste being managed in the equipment. Since GSK is a LQG of hazardous waste, Subpart BB has potential applicability to its Necropsy Laboratory operations.

Subpart BB establishes LDAR requirements for monitoring and repairing leaks from various piping components, including valves, flanges, pumps, sampling connections, pressure relief valves, and others, exposed to hazardous wastes containing an organic concentration of at least 10 percent by weight. However, if the piping components are exposed to hazardous wastes containing 10% or more for less than 300 hours per calendar year, then the equipment is exempted from the monitoring and LDAR requirements and GSK is only required to keep a list identifying the affected equipment by name or location in its files. Hazardous wastes with organic concentrations of less than 10% by weight are not regulated under the Subpart BB standard.

If the equipment is regulated under the Subpart BB standard, then the monitoring and LDAR requirements are dependent on whether the equipment is in light liquid service or in heavy liquid service. To be in light liquid service means the equipment contains or contacts a waste stream where the vapor pressure of one or more of the organic components in the stream is greater than 0.3 kilopascals (kPa) at 20 °C, the total concentration of the pure organic components having a vapor pressure greater than 0.3 kilopascals (kPa) at 20 °C is equal to or greater than 20 percent by weight and the fluid is a liquid at operating conditions. To be in heavy liquid service means that the equipment is not in gas/vapor service or in light liquid service. Therefore, to determine the specific requirements of Subpart BB regulations, it is necessary to determine (1) the organic concentration of the waste, (2) the maximum organic vapor pressure of the hazardous waste in the equipment, and (3) the operating hours the hazardous waste is in contact with the piping system components.

3.0 Applicability Determinations

3.1 Waste Characterization

Ms. Josephine Martin, CHMM, visited the Building 4 Necropsy Laboratory on February 13, 2013, and obtained the waste characterization and other lab operating data to determine the applicability of the Subpart BB regulations. The hazardous waste generated from the lab operations consists of the following chemicals, which can be variable:

1. 85% ETOH, 1.5% KOH and 0.0018% Alizarin Red
2. 0.5% KOH

3. 50% glycerin, 50% deionized water
4. 1% KOH, 0.0011% Alizarin Red
5. 1% KOH
6. 35% ETOH, 50% Glycerin
7. 100% glycerin
8. 70% Ethanol
9. Bouin's solution
10. 1% KOH
11. 85% ETOH, 1.0% KOH and 0.0015% Alizarin Red
12. 10% formalin
13. 100% ethanol

As can be seen in the above list, 100% ethanol contains the highest organic concentration. Since the organic concentration of the 100% ethanol exceeds 10% by weight, the piping system components are regulated under the Subpart BB standard.

3.2 Vapor Pressure Calculations for Determining Type of Service

To determine whether the equipment is in light liquid service or in heavy liquid service, it is necessary to consider the vapor pressure of the hazardous waste. Three criteria need to be met for equipment to be in light liquid service:

1. The vapor pressure of one or more of the organic components of the waste stream is greater than 0.3 kPa. The vapor pressure of ethanol is 44 mmHg or 5.9 kPa at 20 ^{o}C. As a component of the waste stream, 100% ethanol has a vapor pressure of greater than 0.3 kPa.

2. The total concentration of the pure organic components having a vapor pressure of greater than 0.3 kPa at 20 ^{o}C is equal to or greater than 20 percent by weight. The 100% ethanol is greater than 20 percent.

3. The fluid is a liquid at operating conditions. 100% ethanol is a liquid at ambient temperature.

Therefore, based on these three criteria, GSK's equipment is in light liquid service under the Subpart BB regulations.

3.3 300 Hours per Calendar Year Exemption

Due to the limited use of the Necropsy Laboratory equipment containing or contacting the wastes with organic concentrations of greater than 10 percent, it is necessary to calculate the hours of operation of the equipment under currently anticipated worst-case conditions to determine whether the 300-hour/calendar year exemption applies. The lab has twelve sinks in which necropsy

operations are performed and the hazardous wastes are generated. A spur gear pump manufactured by Viking Pump Inc., Model SC40525, is used to pump the hazardous waste from the sinks to the 150-gallon AST on the second floor. To make the determination, IES made the following worst-case assumptions after discussions with the laboratory personnel:

1. All 12 sinks being discharged at the same time
2. 18,000 ml of solution maximum per sink
3. Pump capacity is 0.68 gpm at 10 psig based on system diagram (Attachment A).
4. Sinks are dumped daily for a week with a week of downtime between each week of usage, i.e. 26 times per year.

Based on these worst-case assumptions, IES calculated that the piping system components are exposed to 255 hours/calendar year, as shown in Table 1 in Attachment A. We also calculated the drainage time period from the 150-gallon AST to the 55-gallon drum, which is less than 10 hours/calendar year, as shown in Table 2 in Attachment A.

From these calculations, IES concludes that the Subpart BB regulated components are exposed to hazardous wastes for less than 300 hours/calendar year and, therefore, the Necropsy Laboratory operations are not subject to the monitoring and LDAR program. However, GSK is required to keep a record of the affected equipment by name or location in its files. In addition, GSK should keep reasonable records of the laboratory operations to demonstrate its exemption claim of 300 hours/calendar year.

If the Necropsy Laboratory starts to produce more hazardous waste due to changes in its operations, then GSK has two options to comply with the Subpart BB requirements: (1) replace the Viking pump with a larger capacity pump to keep the piping system components exposed to hazardous waste less than 300 hours/calendar year, or (2) to comply with the Subpart BB requirements.

Should the piping components be exposed to hazardous waste for more than 300 hours/calendar year, then the laboratory equipment will be subject to the monitoring and LDAR program and required to identify and tag all of the equipment components, to initiate the monitoring of these components using EPA Method 21, and repair any leaking components within the allowable timeframe presented in the Subpart BB requirements. If any leaking components cannot be repaired in the given timeframe, then GSK must report the leaking equipment by tag number to the EPA in a semi-annual report.

The Subpart BB standard provides incentives to affected facilities through good maintenance practices and procedures. Basically, these alternate standards reduce the monitoring requirement for

some components from monthly to quarterly, quarterly to semi-annually, and semi-annually to annually.

4.0 Subpart CC

The Subpart CC regulations define a "container" as having a capacity of greater than 26 gallons. Containers with a capacity of less than 26 gallons are exempted from the Subpart CC standard. Therefore, the 55-gallon drum used to collect the hazardous waste from the 150-gallon tank is classified as a Subpart CC container and must meet its requirements. Since this drum meets U.S. Department of Transportation (DOT) requirements, it therefore meets the Subpart CC container Level 1 control requirements. IES has already discussed the Level 1 control requirements for the 150-gallon tank in its December 2012 report.

The colored drawing presented in Attachment A shows the Necropsy Laboratory's system components that are regulated under the Subparts BB and CC regulations.

5.0 Conclusions

Based on the above applicability analysis, IES concludes the following:

1. The piping system components in the Necropsy Laboratory in Building 4 to the 150-gallon tank and those from the 150-gallon tank to the 55-gallon drum are regulated under the Subpart BB standard.

2. Since these piping components are exposed to organic hazardous wastes containing 10% or more by weight for less than 300 hours per calendar year, the equipment is exempted from the monitoring and LDAR requirements and GSK is required to keep a list identifying the affected equipment by name or location in its files.

3. The 55-gallon drum, which is classified as a "container" under the Subpart CC standard, meets the standard's Level 1 control requirements since it is DOT certified.

This letter addresses the compliance of this equipment with the RCRA Subpart BB regulations. Furthermore, it should be noted that these air emission regulations are RCRA regulations and not part of the Clean Air Act regulations; hence, the Subpart BB air regulations are not included in the site's Title V operating permit.

Should you have any questions, please feel free to contact me.

Sincerely,

Robert W. Schlosser /e/
Robert W. Schlosser, P.E.
Principal Project Manager

Attachment
cc: J. Martin, IES
A. Soni, IES

Attachment 2

Leak Detection and Repair Equipment Tag List

GlaxoSmithKline - Upper Merion
Necropsy Lab - Hazardous Waste Tank Equipment Labeling

Area Location	Associated Equipment	Tag	Comp-type (VL, Pump, etc.)	Sub-type (BV, etc.)	size (dia.-inches)	Description	Accessible (Y/N)
Necropsy Lab	Bottom Necropsy Lab Sink	00001	VL	BV	1.5	Ball Valve below Tag 3 under sink - First set of 3 sinks from to Lab exit	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00002	Drain Plug	--	1.5	Drain Plug - First set of 3 sinks from to Lab exit	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00003	Drain Plug	--	1.5	Drain Plug - First set of 3 sinks from to Lab exit	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00004	Drain Plug	--	1.5	Drain Plug - First set of 3 sinks from to Lab exit	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00005	VL	BV	1.5	Ball Valve below Tag 7 under sink - Second set of 3 sinks from to Lab exit	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00006	Drain Plug	--	1.5	Drain Plug -Second set of 3 sinks from to Lab exit	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00007	Drain Plug	--	1.5	Drain Plug -Second set of 3 sinks from to Lab exit	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00008	Drain Plug	--	1.5	Drain Plug -Second set of 3 sinks from to Lab exit	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00009	VL	BV	1.5	Ball Valve below Tag 11 under sink - Third set of 3 sinks from to Lab exit	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00010	Drain Plug	--	1.5	Drain Plug - Third set of 3 sinks from to Lab exit	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00011	Drain Plug	--	1.5	Drain Plug - Third set of 3 sinks from to Lab exit	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00012	Drain Plug	--	1.5	Drain Plug - Third set of 3 sinks from to Lab exit	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00013	VL	BV	1.5	Ball Valve below Tag 15 under sink - Fourth set of 3 sinks from to Lab exit	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00014	Drain Plug	--	1.5	Drain Plug - Fourth set of 3 sinks from to Lab exit	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00015	Drain Plug	--	1.5	Drain Plug - Fourth set of 3 sinks from to Lab exit	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00016	Drain Plug	--	1.5	Drain Plug - Fourth set of 3 sinks from to Lab exit	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00017	Pump	--	--	Waste Transfer Pump	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00018	VL	BV	0.25	Ball Valve with Pressure Gauge at end	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00019	Sensor	Temperature	0.75	Temperature Sensor off tee	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00020	VL	BV	0.75	Ball Valve at end of braided line - Downstream of Tag 22	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00021	Filter	--	0.75	Filter in-line between Tags 19 and 23	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00022	VL	BV	0.75	Ball Valve between Tags 20 and 23	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00023	VL	BV	1.5	Ball Valve where sinks and braided line merge before filter and pump	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00024	VL	BV	0.75	Ball Valve with Pressure gauge at end. Pump Outlet.	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00025	VL	CK	0.75	Check Valve between Tags 24 and 26	Y
Necropsy Lab	Bottom Necropsy Lab Sink	00026	VL	BV	0.75	Ball Valve after Tag 25 before exit to ceiling	Y
Necropsy Lab	Fume Hood	00027	VL	BV	1.5	Ball Valve under Fume Hood - *Drain is plugged.	Y
Necropsy Lab	Waste Line to Waste Tank	00028	VL	BV	0.75	Ball Valve above drop ceiling exiting to hallway	N
Solvent Storage Area 1	Tank - Bottom	00029	VL	BV	1.5	Ball Valve bottom of tank to braided line	Y
Solvent Storage Area 1	Tank - Bottom	00030	VL	BV	0.75	Ball Valve at end of braided line - *Used to fill drums	Y
Solvent Storage Area 1	Tank - Top	00031	Vent	--	4	Emergency Relief Vent	Y
Solvent Storage Area 1	Tank - Top	00032	Level Probe	--	0.5	Level Probe used to monitor tank level	Y
Solvent Storage Area 1	Tank - Top	00033	Vent	--	1.5	Vent to atmosphere - Vent includes flame arrestor with U/S and D/S flanges	Y
Solvent Storage Area 1	Tank - Top	00034	VL	BV	0.5	Ball Valve off indirect line below direct line to tank	Y
Solvent Storage Area 1	Tank - Top	00035	Alarm	--	0.5	High Level Alarm - Tank	Y
Solvent Storage Area 1	Tank - Top	00036	Bung	--	1.5	Tank bung with end cap	Y

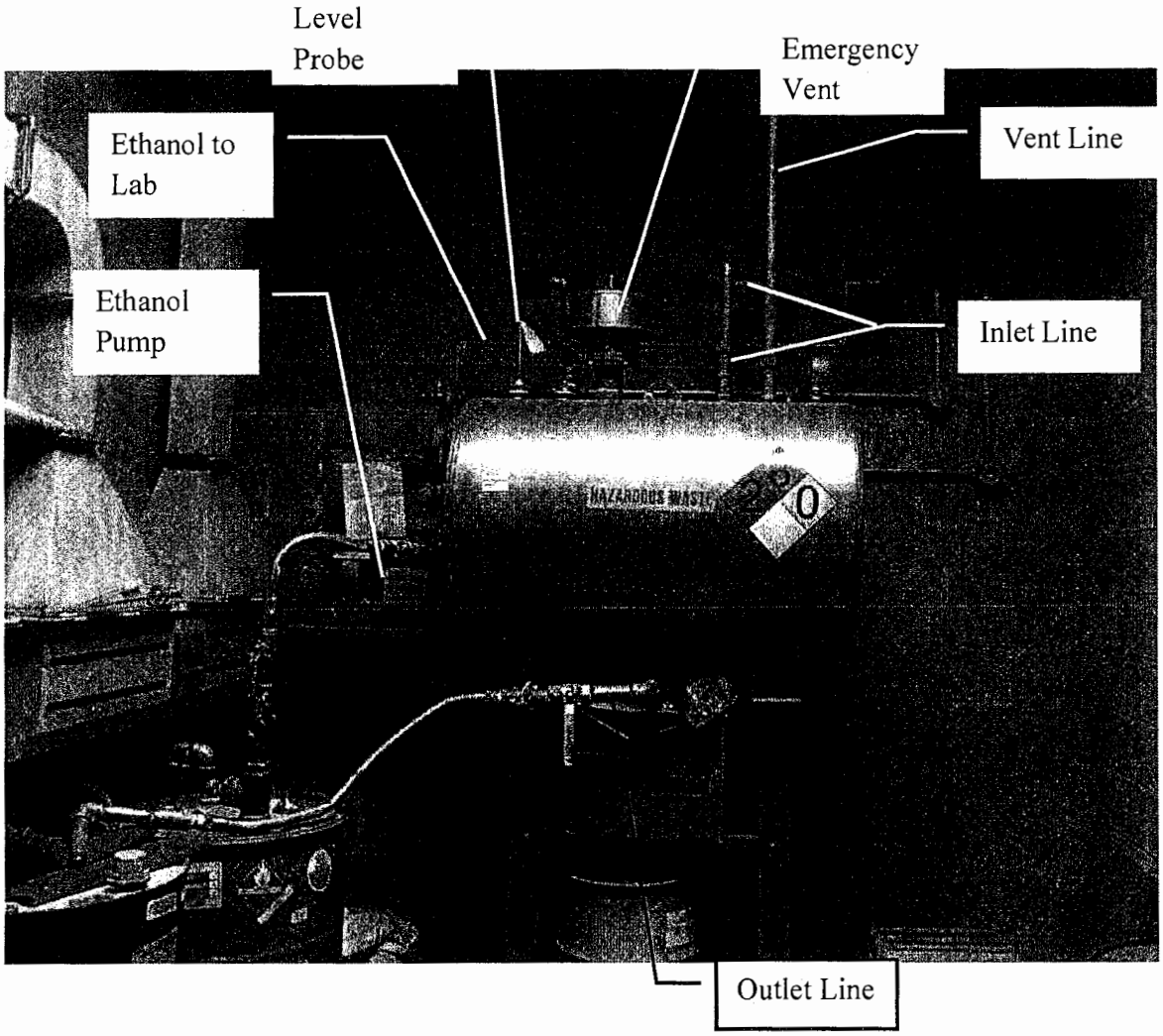
Attachment 4

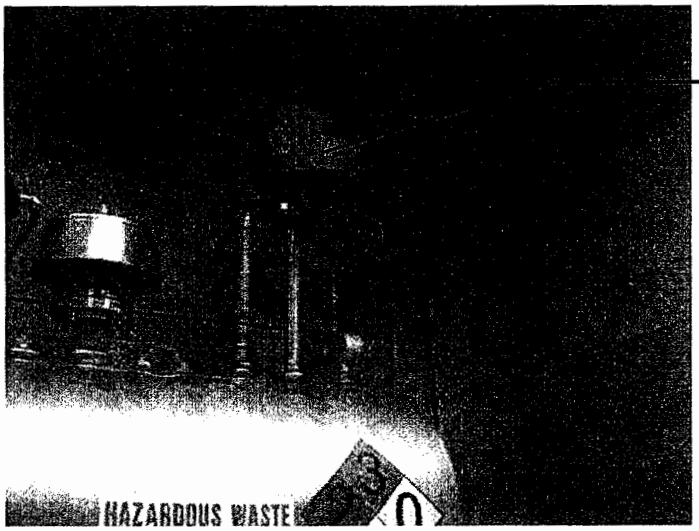
Inspection and Monitoring Plan

Attachment 5

Labeled Hazardous Waste Tank Picture

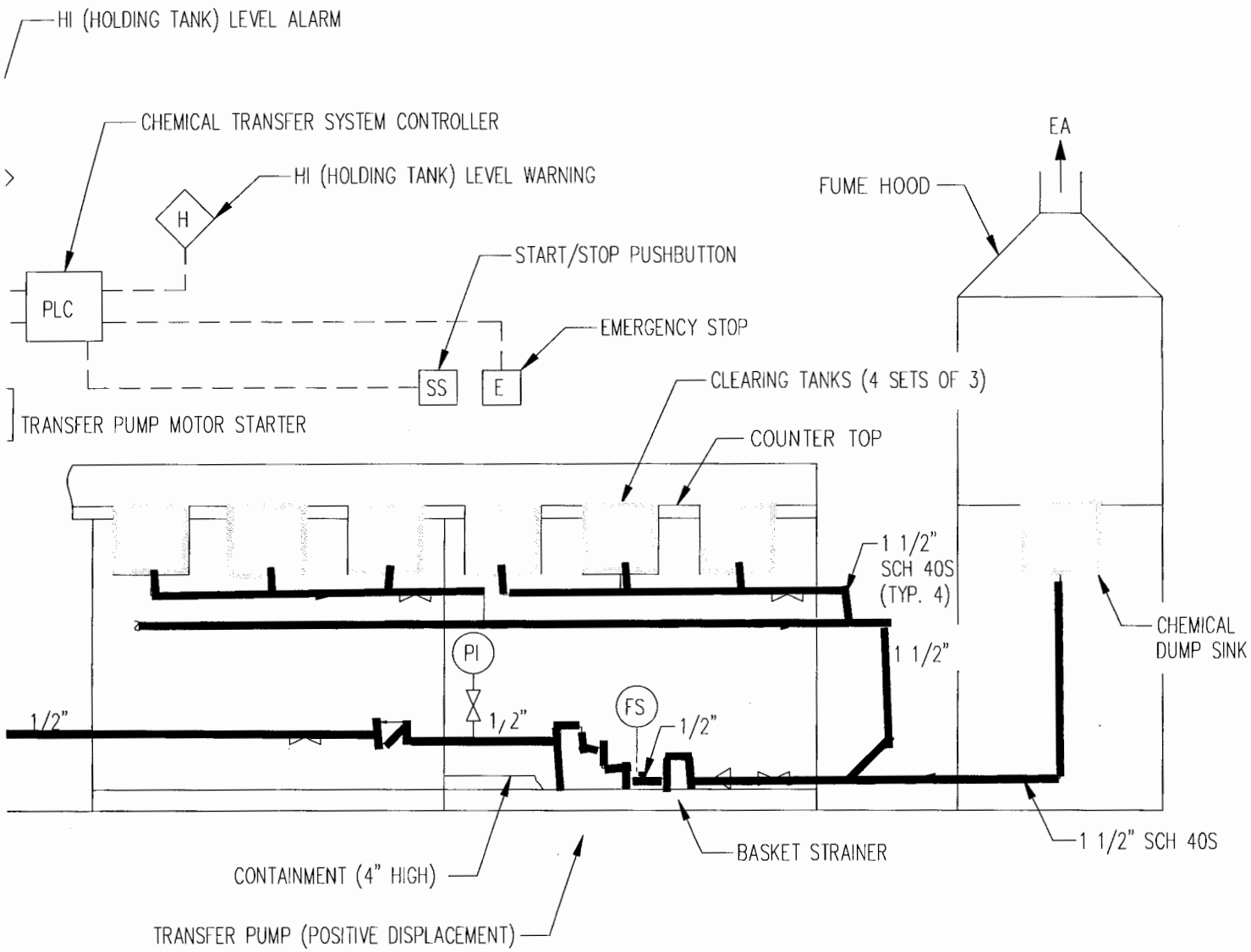
Attachment 5
GlaxoSmithKline
Building 4 Hazardous Waste Tank





NECROPSY LAB

NO. 2060



SYSTEM P&ID

Excerpt from Drawing No. 04-04-95

D/OR LOCAL AUTHORITIES HAVING
ORS SAFETY BOOK, (LATEST EDITION).

ER) SHALL OBTAIN AND PAY FOR ALL
EW WORK.

I GSK'S SPECIFIED METHODS AND
ROJECT MANAGER/ENGINEER.

ENTS OF ALL TRADES REVIEWING ALL OF
EPANCIES BETWEEN DOCUMENTS SHALL BE

ND WORKMANSHIP FOR A PERIOD OF ONE

LITY OPERATIONS DURING CONSTRUCTION;
TITIONS TO PROTECT ADJACENT
E (5) WORKING DAYS PRIOR TO ANY

STALL". THE TERM "FURNISH", WHEN USED
POINT OF INSTALLATION ON THE JOB. THE
TO PROVIDE ALL MATERIAL, EQUIPMENT,
INAL POSITION, CONNECT AND COMPLETELY
S AND MECHANICAL SHUTOFFS, AND
S", WHEN USED SEPARATELY, SHALL MEAN
S, AND ELECTRICAL DISCONNECTS AND
TO EQUIPMENT FURNISHED AND SET IN

) TO CONVEY THE SCOPE OF WORK
NG ALL PIPING, FITTINGS AND ACCESSORIES

AT THE JOB SITE BEFORE INSTALLATION OF
SHALL NOT SCALE DRAWING.

G HIS WORK WITH ALL OTHER TRADES AND

CHANICAL/PIPING DRAWINGS ON SITE AND
"AS-BUILTS" SHALL BE SUBMITTED TO

D EQUIPMENT AND PIPING AS REQUIRED BY
ICAL CODE (NEC), THE OCCUPATIONAL
IONAL FIRE PROTECTION ASSOCIATION

NG AND CLEANUP ON A DAILY BASIS AND

R OF ALL PIPING AND EQUIPMENT OF
URN OVER TO THE OWNER.

RIALS BEING DELIVERED IN A CLEAN AND
FACE COVERS, AND SIMILAR PROTECTION
ATION OR ERECTION. CARE SHALL BE
ING MATERIALS, ESPECIALLY PREFABRICATED
ATION BY GREASE, MOISTURE, OR FOREIGN

NGERS, HARDWARE, SUPPLEMENTAL STEEL
NT SUPPORT. SUPPORTS SHALL BE
OMMENDATIONS.

E REPLACING ALL ACOUSTICAL CEILING TILES
S OF WORK.

PING FIRE-STOP SEALS, WITH A UL LISTED
PENETRATED WALL OR FLOOR.

VENDOR/ SERVICEMAN REGULATIONS FOR

/ THE GSK PROJECT MANAGER AT THE

RWISE INDICATED OR APPROVED BY THE
E ALL SURFACES REMOVED, DAMAGED, OR
PECIFIED HEREIN AND ON THE DRAWINGS,
ORE THE WORK BEGAN. THIS SHALL
GYPSUM BOARD, PLASTER, ACOUSTICAL
NG, ETC. PATCHING SHALL BE DONE BY
ATERIALS BEING PATCHED. NOTE: CEILINGS
STING HAS BEEN COMPLETED AND

RS AND OTHER EQUIPMENT, INCLUDING
D TRADES ASSOCIATIONS'
F THE SPECIFIED WORK.

NLESS NOTED OTHERWISE.

EMICAL PPG - DEMO & NEW WORK ALT 1

PROCESS (CHEMICAL) PIPING INSTALLATION NOTES:

1. THE (PROCESS) CHEMICAL PIPING SYSTEM IS DESIGNED IN ACCORDANCE WITH THE NATIONAL FIRE PROTECTION ASSOCIATION'S (NFPA) AND FACTORY MUTUAL (FM) RECOMMENDATIONS.
2. THE TRANSFER PUMP (PRESSURIZED) DISCHARGE AND DRUM FILL PIPING SHALL BE FABRICATED, ERECTED/INSTALLED, TESTED, ETC. IN ACCORDANCE WITH ASME PROCESS PIPING CODE, B31.3 (LATEST EDITION) UNLESS SPECIFIED OTHERWISE HEREIN. ALL PIPE WELDS SHALL MEET THE REQUIREMENTS OF ASME B31.3, CHAPTER V AND ASME SECTION IX. THE CONTRACTOR SHALL PROVIDE ALL WELDING PROCEDURES AND CERTIFICATIONS PRIOR TO BEGINNING WORK.
3. ALL WELDING SHALL BE PERFORMED BY WELDERS HOLDING VALID TEST CERTIFICATES IN COMPLIANCE WITH THE WELDING REQUIREMENTS.
4. CONTRACTOR SHALL EXAMINE ALL PIPING, FITTINGS, VALVES, EQUIPMENT, ET. AL. FOR DEFECTS OR DAMAGE. INSTALLATION OF DEFECTIVE OR DAMAGED MATERIALS IS PROHIBITED.
5. CONTRACTOR SHALL NOT DEVIATE FROM THE DRAWINGS AND SPECIFICATIONS WITHOUT ENGINEERING APPROVAL.
6. ALL PIPING SHALL BE INSTALLED FREE OF STRAIN (I.E. COLD SPRING IS PROHIBITED).
7. THE TRANSFER PUMP DISCHARGE PIPING SHALL BE INSTALLED, PREFERABLY FREE OR WITH A MINIMUM NUMBER OF POCKETS; AND SHALL BE ROUTED AS FAR AWAY FROM HEAT SOURCES AS POSSIBLE. CONTRACTOR SHALL PROVIDE SUBMITTAL DRAWING OF TRANSFER PUMP DISCHARGE PIPING ROUTE FOR ENGINEERING APPROVAL PRIOR TO FABRICATION AND INSTALLATION.
8. THE USE OF THREADED FITTINGS IN THE TRANSFER PUMP DISCHARGE PIPING SHALL BE MINIMAL AND LIMITED TO THE AREA UNDER THE CLEARING TANKS. ALL THREADED CONNECTIONS IN THE 1/2" TRANSFER PIPING SHALL BE SEAL WELDED, EXCEPT THREADED INSTRUMENT CONNECTIONS.
9. CONTRACTOR SHALL INSTALL PIPE SUPPORTS IN ACCORDANCE WITH THE SPACING REQUIREMENTS OF MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS INDUSTRY (MSS) STANDARD SP-69 FOR WATER SERVICE, AND THE (PIPE SUPPORT) MANUFACTURER'S RECOMMENDATIONS.
10. CONTRACTOR SHALL CLEAN ALL DIRT, WELD BEADS, AND FOREIGN MATTER FROM ALL PIPING, AND SHALL FLUSH SAME. OWNER SHALL BE NOTIFIED THREE (3) DAYS PRIOR TO TEST TO ALLOW THE ENGINEER AN OPPORTUNITY TO WITNESS THE TEST.
11. CONTRACTOR SHALL PROVIDE THE FOLLOWING: TRANSFER PUMP, (TRANSFER) PUMP STRAINER, HOLDING TANK, (HOLDING TANK) SUPPORT STAND, INSTRUMENTS, DRUM DIP TUBE, AND ALL APPURTENANCES.
12. CONTRACTOR SHALL PERFORM THE FOLLOWING PRE-OPERATIONAL TESTING: OWNER SHALL BE NOTIFIED THREE (3) DAYS PRIOR TO ALL TESTING TO ALLOW THE ENGINEER AN OPPORTUNITY TO WITNESS THE TEST.
    A. LEAK TEST OF THE CHEMICAL (FLAMMABLE AND COMBUSTIBLE LIQUID) HOLDING TANK. IN THE EVENT OF A LEAK, THE MANUFACTURER SHALL BE CONTACTED TO MAKE REPAIRS. RE-TEST AS NECESSARY.
    B. LEAK TEST (STANDING WATER COLUMN) THE 1 1/2" CHEMICAL (GRAVITY) DRAIN PIPING. ALL LEAKS SHALL BE REPAIRED AND THE SYSTEM RE-TESTED.
    C. HYDROSTATIC (PRESSURE) TEST THE TRANSFER PUMP DISCHARGE AND DRUM FILL PIPING TO 50 PSIG FOR 30 MINUTES. THE TRANSFER PUMP AND HOLDING TANK SHALL BE EXCLUDED FROM TEST. REPAIR ALL LEAKS AND RE-TEST AS NECESSARY.
13. CONTRACTOR SHALL PROVIDE QUALIFIED PERSONNEL TO EXAMINE THE SYSTEM'S INTEGRITY DURING OWNER'S STARTUP.
14. CONTRACTOR SHALL PROVIDE OWNER WITH ALL COMPONENT AND EQUIPMENT INSTALLATION AND MAINTENANCE MANUALS, AND ALL OTHER PERTINENT DOCUMENTATION REGARDING THE SYSTEM, COMPONENTS AND EQUIPMENT REQUIRED BY THE OWNER.
15. CONTRACTOR SHALL LABEL ALL PIPING AND TAG ALL VALVES IN ACCORDANCE WITH THE GSK'S STANDARDS. PIPING SHALL BE LABELED AS 'WARNING: CONTAINS FLAMMABLE AND COMBUSTIBLE LIQUIDS AND CANCER HAZARD' AT TWENTY (20) FOOT INTERVALS. LABELS SHALL MATCH EXISTING BLDG. 3 FORMALIN WASTE SYSTEM LABELS.
16. CONTRACTOR SHALL INSTALL A 1/4" X 4" X ~42" LONG SST FLAT BAR INSIDE THE CABINET DOORS OF THE TRANSFER PUMP COUNTER TO FORM A 'WATERTIGHT' CONTAINMENT AREA, WHICH CAN ACCOMMODATE APPROXIMATELY 12 GALLONS. AREA SHALL BE SEALED WITH CAULK WHICH IS COMPATIBLE WITH AFOREMENTIONED MEDIUM, AND LEAK TESTED (STANDING WATER COLUMN). REPAIR ALL LEAKS AND RE-TEST.
17. CONTRACTOR SHALL INSTALL VIBRATION CONTROL PAD BETWEEN THE TRANSFER PUMP BASE AND THE CLEARING TANK COUNTER'S FLOOR.
18. CONTRACTOR SHALL LOCATE FLAME ARRESTER OUTDOORS, AWAY FROM COMBUSTIBLE CONSTRUCTION; TERMINATION SHALL BE MINIMUM OF 2'-6" ABOVE THE HIGH POINT OF THE TRANSFER PIPING AND 2' AWAY FROM BUILDING OPENINGS (TO ASSURE VAPORS CAN NOT BE DRAWN INTO THE BUILDING). VENT PIPING SHALL BE SLOPE DOWNWARD TO THE HOLDING TANK AND SHALL BE FREE OF POCKETS.
19. WELDING OF HOLDING TANK STRUCTURAL SUPPORT STAND SHALL COMPLY WITH THE AMERICAN WELDING SOCIETY CODE.

PROCESS INSTRUMENTATION SPECIFICATIONS:

TRANSFER SYSTEM CONTROLLER: ALLEN-BRADLEY MICROLOGIC 1000 PLC, MODEL 1761L16AWA WITH HAND HELD PROGRAMMER 1761-HHP-B30.

TRANSFER PUMP START/STOP PUSHBUTTON: ALLEN-BRADLEY MODEL 800T-D6QA

TRANSFER PUMP EMERGENCY STOP: ALLEN-BRADLEY MODEL 800T-2TA

HOLDING TANK LEVEL SWITCH: KOBOLD INSTRUMENTS, INC. MODEL NCM, 1" NPT CONNECTION, TWO (2) SWITCHES, STAINLESS STEEL WETTED PARTS, AND POLYPROPYLENE FLOAT.

TRANSFER PUMP FLOW SWITCH: KOBOLD INSTRUMENTS, INC. MODEL PSR, 1/4" NPT CONNECTION, STAINLESS STEEL WETTED PARTS.

TRANSFER PUMP PRESSURE INDICATOR: ASHCROFT PRESSURE GAUGE, TYPE 1008, 50MM, LIQUID FILLED, STAINLESS STEEL WETTED PARTS, 1/4" NPT CONNECTION, AND 0-15 PSI RANGE.

CHEMICAL SYSTEM FUNCTIONAL DESCRIPTION:

1. MANUAL START/STOP OF TRANSFER PUMP AND (HOLDING TANK'S) HI-LEVEL AUTOMATICALLY SHUTS OFF TRANSFER PUMP.
2. HI (HOLDING TANK) WARNING LIGHT IN ROOM 2060 AND THE CENTRAL PLANT MONITORING SYSTEM.
3. TRANSFER PUMP DISABLED AT (HOLDING TANK) HI-LEVEL ALARM POINT.
4. E-STOP OF TRANSFER PUMP.
5. TRANSFER PUMP SHALL STOP WHEN SUCTION FLOW IS ZERO. (NOTE: PUMP SHALL SHUTOFF IN LESS THEN 30 SECONDS AFTER NO FLOW CONDITION.) PUMP START (CUTOUT NO FLOW SIGNAL) OVERRIDE OF NO-FLOW SIGNAL.

KEYED DEMOLITION NOTES:

(1) REMOVE PVC PIPING AND VALVE FROM CLEARING TANK STRAINER TO END - TYPICAL 4 PLACES.

KEYED NEW WORK NOTES:

(1) PROVIDE CHEMICAL WASTE DISPOSAL SYSTEM INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING: 1-1/2" SS CHEMICAL (GRAVITY) DRAIN PIPING, BASKET STRAINER, TRANSFER PUMP, 1/2" SS CHEMICAL (PRESSURIZED) PIPING, VALVES, 150-GALLON HOLDING TANK, DRUM TRANSFER PIPING AND DIP-TUBE, STRUCTURAL SUPPORT STAND, 1-1/2" VENT PIPING, AND ALL VALVING, PIPE SUPPORTS, INSTRUMENTS, APPURTENANCES AS SPECIFIED AND SHOWN HEREIN AND ON DRAWING 04-04-96.

(2) PROVIDE 20 X 20 STAINLESS STEEL WIRE MESH CLOTH (TACK WELD IN PLACE) ON THE UNDERSIDE OF THE EXISTING CLEARING TANK PERFORATED STRAINERS; AND A 'U'-SHAPED LIFTING EYE FOR EACH STRAINER, AND PROVIDE A 12" LONG FISH HOOK FOR STRAINER REMOVAL - TYPICAL 12 PLACES.

(3) PROVIDE TRANSFER PUMP CONTAINMENT.

(4) PROVIDE CONTROL SYSTEM.

PROCESS PIPING SPECIFICATIONS:

CHEMICAL (GRAVITY) DRAIN PIPING - FLAMMABLE & COMBUSTIBLE LIQUIDS (CLEARING TANKS AND CHEMICAL DUMP SINK TO PUMP SUCTION):
PIPING SHALL BE ASTM A-312 TYPE 304 SEAMLESS STAINLESS STEEL, SCHEDULE 40S, THREADED ENDS.

FITTINGS, INCLUDING UNIONS, SHALL BE 150 LB. GRADE 304 STAINLESS STEEL, THREADED ENDS AND CONFORMING TO ANSI B16.3 AND MSS (MANUFACTURER'S STANDARDIZATION SOCIETY OF VALVE AND FITTINGS INDUSTRY) SP-114. LATERALS SHALL BE CLASS 3000 STAINLESS STEEL, ASTM A-182, GRADE F304, THREADED ENDS.

JOINTS SHALL BE THREADED.

UNIONS - SEE FITTINGS ABOVE.

FLANGES (SLIP-ON AND BLIND) - SHALL BE 150 LB. RF ASTM A-182, TYPE 304 STAINLESS STEEL.

VALVES (SHUTOFF) SHALL BE WORCESTER CONTROLS, SERIES 44 BALL VALVE, ANSI CLASS 600, 316 STAINLESS STEEL, THREADED ENDS, TEFLON SEATS AND SEALS, UL LISTED FOR FLAMMABLE LIQUID SHUTOFF (YRBX).

CHEMICAL (PRESSURIZED, VENT AND DRUM FILL) PIPING - FLAMMABLE & COMBUSTIBLE LIQUIDS (PUMP DISCHARGE TO HOLDING TANK; HOLDING TANK VENT AND DRUM FILL):
PIPING SHALL BE ASTM A-312 TYPE 304 SEAMLESS STAINLESS STEEL, SCHEDULE 40S, PLAIN ENDS.

FITTINGS SHALL BE AS FOLLOWS:
BUTT WELD FITTINGS SHALL BE SCHEDULE 40S, ASTM A403 WP304 BUTT-WELDING; ELBOWS SHALL BE LONG RADIUS.
SOCKET WELD FITTINGS SHALL BE CLASS 3000, ASTM A-182, GRADE 304.
THREADED FITTINGS SHALL BE CLASS 2000, ASTM A-182, GRADE F304.

JOINTS SHALL BE BUTTWELD, SOCKET WELD AND THREADED AS NOTED ON THE DRAWING (SEE INSTALLATION NOTE 8).

VALVES (SHUTOFF AND INSTRUMENT ROOT) SHALL BE WORCESTER CONTROLS, SERIES 44 BALL VALVE, ANSI CLASS 600, 316 STAINLESS STEEL, THREADED ENDS, TEFLON SEATS AND SEALS, UL LISTED FOR FLAMMABLE LIQUID SHUTOFF (YRBX).

VALVE (CHECK) SHALL BE CIRCLE SEAL CONTROLS, INC. 200 SERIES, 316 STINALESS STEEL, TEFLON O-RING, FEMALE THREADED PIPE CONNECTIONS.

PROCESS EQUIPMENT AND OTHER SPECIFICATIONS:

TRANSFER PUMP: SPUR GEAR PUMP, VIKING PUMP, INC. MODEL SG40525, STANDARD CONSTRUCTION, 1/2" NPT PORTS WITH TEFLON MECHANICAL SEAL. PUMP SHALL INCLUDE OVER-PRESSURE RELIEF VALVE AND SHALL BE MOUNTED ON A BASE, COMPLETE WITH COUPLING AND GUARD, DRIVEN BY A 1/3 HP, 1200 RPM, 3/60/230-460V EXPLOSION PROOF MOTOR.
MEDIUM: ETHANOL AND FORMALDEHYDE
→ CAPACITY: 0.68 GPM AT 10 PSIG

(TRANSFER PUMP) BASKET STRAINER: BASKET-TYPE LINE STRAINER, VIKING PUMP, INC. MODEL NO. F-1007-IISST, 3/4" NPT CONNECTIONS, STAINLESS STEEL CONSTRUCTION WITH TEFLON ENCAPSULATED O-RING AND 100 MESH BASKET SCREEN. STRAINER SHALL BE COMPATIBLE WITH AFOREMENTIONED TRANSFER PUMP.

CHEMICAL HOLDING TANK: 150 GALLON (NOMINAL) ABOVEGROUND, SINGLE-WALL, STAINLESS STEEL TANK 30" DIAMETER BY 4'-0" LONG. TANK SHALL BE FABRICATED FROM ASTM A240 TYPE 304 STAINLESS STEEL WITH FLAT-FLANGED HEADS; AND SHALL INCLUDE TWO CARBON STEEL UL-STYLE SADDLES AND LIFTING LUGS (FOR HANDLING). TANK SHALL BE MANUFACTURED, TESTED AND LABELED IN ACCORDANCE WITH UNDERWRITERS LABORATORIES' UL-142 SPECIFICATIONS.

MEDIUM: ETHANOL, FORMALDEHYDE AND OTHER
OPERATING PRESSURE: ATMOSPHERIC
CONNECTIONS:
INLET: 150 LB. FLANGED WITH CONCENTRIC 1/2" 'DIP-TUBE' (EXTEND TO ~2" ABOVE TANK BOTTOM)
OUTLET: 1-1/2" FPT CONNECTION
VENT: 1-1/2" FPT CONNECTION
EMERGENCY VENT: TO BE SIZED AND FURNISHED BY MANUFACTURER IN ACCORDANCE WITH UL-142.
LEVEL SWITCH: 1" FPT CONNECTION

FLAME ARRESTER: THE PROTECTOSEAL COMPANY SERIES 667D, 2" FPT CONNECTION, STAINLESS STEEL CONSTRUCTION, UL LISTED.

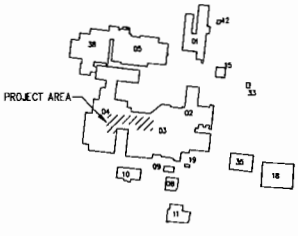
DRUM FILL TRANSFER HOSE ASSEMBLY: AEROQUIP CONVOLUTED PTFE HOSE WITH NONCONDUCTIVE TUBE AND (2) SS MALE PIPE CRIMP FITTINGS, PART NO. FC563-MP-MP-20-20-20-4FT COMPLETE WITH HIGH VOLUME SS COUPLING, PART NO. P10HF10-S AND HIGH VOLUME SS NIPPLE PART NO. PH10F10-S.

GENERAL DEMOLITION NOTES:

1. DEMOLITION/RELOCATIONS: EACH CONTRACTOR SHALL BE RESPONSIBLE FOR DEMOLITION AND RE-LOCATIONS OF SERVICES, EQUIPMENT AND MATERIAL RELATING TO THEIR RESPECTIVE TRADE.
2. CONTRACTOR SHALL NOT INTERFERE WITH NORMAL FACILITY OPERATIONS DURING DEMOLITION AND CONSTRUCTION. PROVIDE ALL REQUIRED TEMPORARY BARRICADES AND PARTITIONS TO PROTECT ADJACENT OWNER OPERATIONS. NOTIFY OWNER AT LEAST FIVE WORKING DAYS PRIOR TO ANY REQUIRED SYSTEM SHUTDOWNS.
3. THE CONTRACTOR SHALL COORDINATE THE DISPOSITION OF REMOVED ITEMS, WHICH ARE TO BE RETAINED, WITH THE OWNER. ALL OTHER ITEMS, RUBBISH AND CONSTRUCTION DEBRIS SHALL BE REMOVED BY THE CONTRACTOR OFF SITE AND DISPOSED OF IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS.
4. CONTRACTOR SHALL FIELD VERIFY EXTENT OF DEMOLITION REQUIRED. DO NOT SCALE DRAWINGS.
5. ALL DEMOLITION SHALL BE COMPLETED IN A PROFESSIONAL MANNER WITH A MINIMUM OF DUST AND DIRT.

PLC	PROGRAMMABLE LOGIC CONTROLLER
◇	KEYED NEW WORK NOTES
(#)	KEYED DEMOLITION NOTE
//////	ITEMS TO BE REMOVED
◄	DIRECTION OF FLOW
⊗	CONNECT TO EXISTING

CHEMICAL WASTE DISPOSAL SYSTEM
ISSUED FOR BID
25 MARCH 2003
* * NOT FOR CONSTRUCTION * *



BUILDING IDENTIFICATION

01 CHEMCO
02 BIOLOGICAL SCIENCES, ADMINISTRATION AND DIAGNOSTICS
03 PATHOLOGY/TOXICOLOGY
04 RESEARCH AND DEVELOPMENT BUILDING
05 ANTIBIOTIC MANUFACTURING
08 HIGH PRESSURE LABORATORY
09 REACTOR LABORATORY
10 FERMENTATION PILOT PLANT
11 CHEMICAL ENGINEERING
12 GAS/FIRE PUMP HOUSE
15 ELECTRIC SUB-STATION #2
18 SITE SERVICES
19 OIL PUMP HOUSE
33 GUARDHOUSE - EAST
35 ENVIRONMENTAL CONTROL BUILDING (DEVINE BLDG.)
36 BIOPHARMACEUTICAL RESEARCH PILOT FACILITY

LOCATION PLAN - EAST CAMPUS

GLAXOSMITHKLINE R&D