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Conceptual Design Report for the Project to Install Leak Detection in FAST-FT-534/548/549

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PROJECT SUMMARY

This report provides conceptual designs and design recommendations for installing secondary containment and leak detection systems for three sumps at the Fluorinel and Storage Facility (FAST), CPP-666. The FAST facility is located at the Idaho Chemical Processing Plant (ICPP) at the Idaho National Engineering Laboratory (INEL).

The three sumps receive various materials from the FAST water treatment process. Sump VES-FT-534 receives mixed hazardous wastes consisting mainly of contaminated basin water with some dilute nitric acid. Sump VES-FT-548, the Non-contaminated Sump, receives the steam condensate and floor drain waste streams; and sump VES-FT-549, the Chemical Waste Sump, primarily receives the materials coming from the chemical makeup tanks, mainly dilute nitric acid and dilute sodium hydroxide. Currently, none of the sumps have secondary containment with leak detection capability. In designing the new system, special considerations should be taken for the material selection. The materials used to fabricate the secondary containment/leak detection systems need to be chemically inert and non-reactive with the materials the sumps are designed to contain.

This project involves sump upgrades to meet appropriate environmental requirements. The steps include: providing sump modifications or designs for the installation of leak chases and/or leakage accumulation, coating the sump concrete with a chemical resistant sealant (except for sump VES-FT-534 which is already lined with stainless steel) to act as secondary containment, lining the sumps with a primary containment system, and providing a means to detect and remove primary containment leakage that may occur.

The recommended design for secondary containment involves the use of a synthetic reinforced coating system. Sentry Polymers, Inc. of Freeport, Texas, provides secondary containment systems with leak detection capability specifically designed to meet environmental requirements for hazardous material containments, Semstone® materials. A reinforced coating system is applied to pre-installed false walls and floor, and the false walls and floor

provide the necessary primary containment. The present sump will be the secondary containment which will collect any leakage. The Semstone® lining materials are currently being tested to determine suitability for this project's application. Alternative lining materials are being investigated.

A leak detection pipe from the top of the sump provides access to where leaked materials would collect on the current sump floor. A leak detection device with alarm and a pump will be installed in this pipe. The alarms would actuate when liquid leakage from the primary containment has is detected. Local control panel (LCP) LCP-22 and LCP-21 are located in the FAST water treatment area and are easily accessible. Alarm panel LCP-22 will be used for sump VES-FT-534 leak detection alarm, and alarm panel LCP-21 will be used for sumps VES-FT-548 and VES-FT-549.

In the event of a sump liner leak, the leak detection system would alarm. Operations personnel would then assess the leakage and manually activate the pump as necessary. The pump will simply return the leaked contents back into the primary containment. This process will continue until the leakage has been determined excessive and/or a point in the plant process is reached where the sump system can be shut down, the sump contents removed, and the liner repaired. This system will prevent any inadvertent release of sump contents to the environment.

The secondary containment/leak detection systems will be designed for simplicity of maintenance, serviceability of the leak detection system and secondary containment pump, and testing capability of the system for proper operation. The system will meet FAST facility management and production personnel requests and will meet the requirements of the Resource and Recovery Act (RCRA) 40 Code of Federal Regulations (CFR) 265.193 for double containment and Department of Energy (DOE) Order 6430.1A for design criteria.

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ACRONYMS

CFR	Code of Federal Regulations
CPP-666	Fluorinel and Storage Facility
DOE	Department of Energy
FAST	Fluorinel and Storage Facility
FRP	Fiberglass Reinforced Plastic
ICPP	Idaho Chemical Processing Plant
INEL	Idaho National Engineering Laboratory
IH	Industrial Hygiene
LCP	Local Control Panel
OHP	Operations Health Physics
RCRA	Resource and Recovery Act
SOP	Standard Operating Procedures
VES-FT-548	Non Contaminated Sump in the Fluorinel and Storage Facility
VES-FT-549	Chemical Waste Sump in the Fluorinel and Storage Facility
VES-FT-534	Contaminated Waste Sump in the Fluorinel and Storage Facility
WINCO	Westinghouse Idaho Nuclear Company

1. PROJECT DESCRIPTION

This project design involves upgrade modifications for three sumps located in the water treatment area of the FAST facility (CPP-666), sumps VES-FT-534, 548, and 549. All three sumps are currently in service and are part of the water treatment process. As indicated in RCRA 40 CFR 265.193, secondary containment criteria, and DOE Order 6430.1A, general design criteria, sumps receiving hazardous materials are to be provided with secondary containment and a means to detect leakage of the primary containment. (See Appendix A for the applicable RCRA 40 CFR 265.193 regulations.) All three sumps may potentially receive hazardous materials. Diluted nitric acid and/or sodium hydroxide are the constituents of primary concern. Sump VES-FT-534 may also receive some radioactive materials. Presently, none of the sumps have secondary containment or leak detection capability.

All three sumps will be cleaned and decontaminated by WINCO Production personnel prior to starting the secondary containment/leak detection project. Modifications for leak chases and optimal leakage collection will be made to the sump concrete foundation for the two sumps not already lined with stainless steel. The sump concrete surface will then be sealed with a chemical resistant coating. A secondary containment/leak detection system will be installed by fabricating a containment liner in each sump. The liner is to provide primary containment of hazardous materials and a space between the liner and the current sump wall. Any liner leakage will flow to the secondary containment leak collection area. A leak detection device with alarm capability and a pump will be installed on the current sump floor between the liner and the existing sump floor. This system will be able to detect and remove any leakage from the primary containment.

The stainless steel liner primary containment system feasibility was evaluated. Section 1.1 identifies some potential problems and disadvantages of installing a stainless steel liner in the sumps. Section 1.2 provides an alternative to the stainless steel liner and lists the advantages and potential problems associated with this system application and design. The conceptual design and design recommendations are developed from the alternative provided.

1.1 Stainless Steel Liner Feasibility

Constructing a stainless steel liner in the concrete sumps would be labor intensive in fabrication and quality assurance and expensive to install. The following list identifies some potential problems and disadvantages of installing a stainless steel liner.

(1) The process of installing the stainless steel liner may create additional problems. There are no embeds in the concrete to anchor or fabricate the stainless steel liner to; therefore, a liner support or bracing system will need to be designed and installed. The most feasible option investigated would be to install "embeds" by fastening flat bar and angles to the concrete using Hilti anchors and then weld the liner sheets to the "embeds". This would be an arduous task and could require up to 300 holes in the sump concrete walls.

(2) The liner cannot be prefabricated and inserted due to the various inlet and discharge lines, pumps, and instrumentation. A major portion of the stainless steel liner would need to be fabricated in situ. One wall for sump VES-FT-549, (10 ft 6 in. by 6 ft by 3/16 in., 304 L stainless steel), would weigh approximately 500 pounds. The stainless steel sheet, therefore, would need to be cut in fairly small sections for handling and working around the various obstacles. This would require a large quantity of welds and embeds. (It would take approximately 300 feet of weld to fabricate a stainless steel liner for VES-FT-549. This does not include the seal welds for the Hilti anchors or embed emplacements.)

(3) Quality assurance on the stainless steel liner would also be extensive. It may be required to liquid penetrant test 100% of the welds according to WINCO Standard Operating Instructions (SOI) 8.9.1. and AWS D1.1. This would require a great deal of time and effort. Both the stainless steel liner construction and inspection could cause a significant down time of the sump operations.

(4) The stainless steel liners should be fabricated up to the inlet weirs running into the sump. A gap exists between the primary containment and the existing sump concrete (secondary containment). The gap is necessary to allow any sump wall leakage to flow to the floor of the secondary containment, and is therefore unavoidable. It would be difficult to seal the top of the stainless steel liner to the concrete sump wall to prevent any materials from entering the secondary containment area from the weirs or overflow from the liner. It would be difficult to verify whether the materials detected in the secondary containment resulted from a leakage problem or ran in from the weirs.

(5) Welding and operating in confined space areas will require significant safety measures for proper ventilation and worker safety.

1.2 Secondary Containment Alternative

Sentry Polymers, Inc. constructs environmental secondary containment systems that can be fabricated in situ with leak detection capability. Currently their lining system materials are being evaluated for performance. Alternative lining materials are being investigated. The advantages of this type of system are as follows:

(1) This product would be more effective than the stainless steel liner and is intended specifically for the project applications. The entire sump could be lined if desired, including working around the weirs and the pipes that protrude into the sumps. It would also be able to seal the top of the liner to the concrete. This would prevent weir materials from flowing into the secondary containment area or having the sump liner overflow into the secondary containment.

(2) The system provides for a leakage accumulation space under the sump liner. The existing sump floor concrete may require some modifications to provide optimal leak collection. The system also provides for a "leak detection pipe". The pipe runs down through

the sump liner and enters into the accumulation space on the floor of the secondary containment. The pipe is sealed to prevent primary containment contents from leaking directly into the leakage accumulation area (secondary containment). A leak detection device as well as a small pump can be placed inside the pipe on the sump floor.

(3) The system would be easier to install compared to the stainless steel liner system. It would be a bit more extensive than applying a paint sealant, but would require less labor than for the stainless steel liner. This also means less down time of the sump operations. The lining system can be constructed around the various pumps, piping, and instrumentation currently in the sumps. Also, because the materials are relatively light weight, most of the liner fabrication may be done outside of the sump.

(4) This particular system will meet RCRA environmental requirements for hazardous material handling systems.

(5) 13 Molar (62%) nitric acid and/or 19 Molar (50%) sodium hydroxide are used in the water treatment process. Although very unlikely, full strength (62%) nitric acid or (50%) sodium hydroxide could potentially enter the sumps under a worst case scenario. Sentry Polymers, Inc. recommends Semstone® 870 for this application. This Sentry material contains a potential carcinogen, styrene. The ICPP N & IS Department generally does not allow potential carcinogens to be used unless justification is provided and/or a suitable alternative can not be located. The secondary containment lining material provided by Sentry Polymers, Inc. (Semstone® 870), has met WINCO Industrial Hygiene and Safety Department approval (See Appendix B). The WINCO Maintenance Plant Services provided a list of recommended paint coating companies to contact for an alternative coating material. The coatings investigated capable of handling the 62% nitric acid, however, contained styrene.

(6) The sumps are confined space areas. Proper ventilation and safety engineering will be required in order to assure worker safety.

2. INITIAL PREPARATION

2.1 Preliminary Safety Analysis

In the design, construction, and operation phases of the sump liner/leak detection systems, good health and safety principles should be applied with safety concerns properly identified and addressed.

All three sumps have been in service since early 1980s. No maintenance records were available; therefore, it is assumed that no maintenance of the sumps have been performed since construction. Surveys of the sump walls and floor and residual materials will be necessary to determine each sump's radiological and chemical hazards. These surveys will also give a better indication of the necessary steps for sump maintenance and upgrades. It will be necessary to enter the sump to make field verification measurements, since the drawings showing its configuration aren't clear.

Given a safe design, adequate procedures, proper training, and industrial hygiene enforcement, the risks to personnel and environment are believed to be low and acceptable. The principal risks will be encountered during the sump decontamination/cleaning process and during installation of the sump liners.

2.2 Training

All personnel required to enter the sumps to work may be required to have the following general training:

- Confined Space Entry Training
- Confined Space Rescue Training (Health Physics personnel)
- Radiation Worker Training
- Chemical Training
- Respirator Training
- Heat Stress Training

All three sumps are confined space zones; therefore, confined space entry training will be required when working in the sumps. The definition for confined space is provided. Special non-standard health physics procedures

may be necessary during secondary containment installation.

Confined space (29 CFR 1910) - "An enclosure such as a storage tank, process vessel, boiler, silo, tank car, pipeline, tube, duct, sewer, underground utility vault, tunnel, or pit having limited means of egress and poor natural ventilation and which may contain hazardous contaminants or be oxygen deficient."

Sump VES-FT-534 is known to be radiologically contaminated and is considered a Zone III area. Sumps VES-FT-548/549 systems were not initially designed to receive radioactive materials, and are not suspected to be contaminated. Although only sump VES-FT-534 is known to be contaminated at this time, radiation worker training may be required for personnel working on all the sumps. Additional training may include site-specific training to familiarize personnel to the risks or hazards involved with the area and/or their specific task assignments.

2.3 General Sump Decontamination Procedures

Sump VES-FT-534 is a Zone III radiological area; however, it is believed that the sump can be "cleaned" considering the contamination type and level. WINCO Production personnel will perform the decontamination efforts. In decontaminating the sump, appropriate WINCO procedures should be followed. The general procedure is outlined below:

1. Radiation Work Permit obtained.
2. The sumps surveyed for the contamination nature and extent by WINCO Operations Health Physics (OHP) Personnel.
3. The sump concrete decontaminated per WINCO decontamination procedures.
4. The sumps resurveyed for contamination by WINCO OHP Personnel.
5. Steps 3 and 4 will be repeated until the sump is decontaminated to a point where decontamination efforts are no longer effective. WINCO Operations Health Physics personnel are responsible for determining the requirements for radiation monitoring and the parameters defining the level of decontamination necessary.

2.4 Sump Data

Table 1. provides sump dimensions, capacity, and surface area information useful for the secondary containment/leak detection system design. For sumps VES-FT-548 and VES-FT-549, the liners should extend at the least up to the lowest overflow weir. The dimensions provided in Table 1 for sumps VES-FT-548 and VES-FT-549 are field measurement values.

Table 1. Sump Dimensions for Design

Sump	Width	Length	Depth	Minimum Height of liner from sump floor	Volume capacity of liner (ft^3)	Total Concrete Surface area covered (ft^2)
VES-FT-534	4′	8′	25′	5′ 6"	176	164
VES-FT-548	5′6"	5′6"	8′4"[a]	5′4"	161	148
VES-FT-549	6′	6′	13′8"[a]	10′7"	381	290

a. These values are measurements taken. Drawings indicate that the sump VES-FT-548 is 8 ft 6 in. deep and sump VES-FT-549 is 13 ft 9 in. deep.

For all three sumps, a conservative estimate for the sump contents temperature is between 40°F to 100°F. The water, in all three cases, is generally ambient temperature as it entering the sumps. Water will always be present in the sumps. This remaining water will dilute any nitric acid and/or sodium hydroxide that drains into the sump.

3. DESIGN CRITERIA

RCRA 40 CFR 265.193 provides the driving criteria prompting action for this project. It provides the environmental design requirements for containment systems handling hazardous constituents. Sumps VES-FT-534 and VES-FT-549 potentially receive hazardous and corrosive liquids and, therefore, must comply with the regulations in order to meet the current environmental requirements for continued operation. Sump VES-FT-548 currently does not receive hazardous materials. For management practices and potential future uses, however, sump VES-FT-548 will have the same design requirements as for VES-FT-534 and VES-FT-549 (hazardous material containment systems).

The design criteria is outlined in the *Functional and Operational Requirements to Install Leak Detection in FAST-FT-534/548/549 (GPP-NMP-93-10), May 1992, by T. H. Waite.* The secondary containment/leak detection systems shall have a 40 year design life and will be designed for simplicity of operation, maintenance, and servicing. The system operation will be safe and reliable and will be designed so that periodic tests can be performed to ensure proper operation.

The materials and equipment selected in the secondary containment system design must be capable of potentially handling 13 Molar (62% concentration) nitric acid and/or 19 Molar (50% concentration) sodium hydroxide under worst case scenarios. However, the probability of those materials entering the sumps at maximum concentration is very small. The primary containment liner will be fabricated in such a way that it allows leaked materials to collect in the secondary containment (existing sump floor) between the liner and concrete foundation. The leak detection system will be capable of detecting and pumping out the leakage. Alarms shall actuate in the event of a primary containment liner leak. The pump will then be manually activated by the FAST personnel. The leakage will be pumped back into the primary containment until a point in the water treatment process is reached where operations can be stopped and the liner repaired. The system installation will not alter the existing sump operations, and modifications to the sump inlet and discharge lines will occur only if absolutely necessary.

The piping, equipment, and installation shall meet the requirements of a "Low Hazard Facility" as outlined in the UCRL-15910, "Design and Evaluation Guidelines for Department of Energy Facilities Subjected to Natural Phenomena," June 1990 and shall meet the requirements for the appropriate codes and standards.

This project has been designated Quality Level II by WINCO Quality Methods and Procedures (QMP) 3-3 and WINCO Standard Operating Procedures (WSOP) WE-1. The Quality Program Plan (QPP) invokes the applicable requirements of the DOE-ID Orders 5700.6C and 4700.1, ANSI/ASME NQA-1, and the WINCO Quality Manual.

4. APPLICABLE CODES AND STANDARDS

Designs, material selection, examination, testing, inspection, certification, and documentation of this project shall comply to the applicable portions of the specifications, codes, and standards listed below.

4.1 General Reference Codes

- American Society of Testing Materials (ASTM) Standards.
- American Society of Mechanical Engineers (ASME/ANSI) B31.3, "Chemical Plant and Petroleum Refinery Piping."
- American Society of Mechanical Engineers (ASME) ASME/ANSI NQA-1, "Quality Assurance Program Requirements for Nuclear Facilities."
- Uniform Building Code (UBC).
- Uniform Plumbing Code (UPC).
- 29 Code of Federal Regulations 1910, "Occupational Safety and Health Administration (OSHA) Standards."

4.2 Department of Energy Codes

- DOE-ID Order 6430.1A, "U. S. Department of Energy General Design Criteria Manual."
- DOE-ID 0550, "Standard Operation Safety Requirements."
- DOE-ID 5700.6C, "Quality Assurance."
- DOE-ID 4700.1, "Project Management System."
- UCRL-15910, "Design and Evaluation Guidelines for Department of Energy Facilities Subjected to Natural Phenomena."

4.3 Idaho National Engineering Laboratory Documents

- INEL Architectural-Engineering Standards.

4.4 Idaho Chemical Processing Plant Documents

- WINCO SOP WE-1, "Quality Level Designation."
- WINCO SOP WE-2, "Construction Safe Work Permit."
- WINCO SOP WE-31, "Natural Phenomena Classification."

- WINCO SOP WP-3, "Facility Outages and Excavation Permits."
- WINCO SOP WS-1, "Classification, Review, an Approval of Documents."
- WINCO SOP WP-10, "Isolation and Tag/Lockout of ICPP Systems and Equipment."
- WINCO Quality Assurance Manual
- WINCO Industrial Safety Manual.

5. GUIDE SPECIFICATIONS OUTLINE

Design, construction, maintenance, and equipment selection for construction projects will be in accordance with specifications.

5.1 General Specifications

SECTION	TITLE
01005	Summary of Work

5.2 Civil/Structural Specifications

SECTION	TITLE
03600	Concrete Cutting
09810	Chemical Resistant Coating
	Lining Concrete Pits for the Purpose of Leak Detection

5.3 Mechanical Specifications

SECTION	TITLE
15404	Air Supply Piping
15160	Pumps
15980	Instrumentation
16141	Wiring Devices

6. DESIGN DESCRIPTION

RCRA 40 CFR 265.193 provides the environmental design requirements for containment systems handling hazardous materials. Sumps VES-FT-534, -548, and -549 receive hazardous materials and must comply with requirements for continued operation. The following sections provide design recommendations for sump modifications, secondary containment, and leak detection systems that will rectify the potential RCRA deficiencies and bring the sumps into environmental compliance - keeping in mind safety and simplicity of operation and maintenance. (See Appendix A for the relevant RCRA 40 CFR 265.193 regulations.)

6.1 Sump Concrete Leak Chase Design

6.1.1 Sumps VES-FT-548 and VES-FT-549

RCRA 40 CFR 265.193 (c)(4) states that "secondary containment systems must be sloped or otherwise designed to drain and remove liquids resulting from leaks, spills, or precipitation from the primary containment." Presently, it is not known if the sump floors for VES-FT-548 or VES-FT-549 are sloped or if inherent low spots exist in construction. The sumps are currently in service, making sump floor observations difficult, and the available drawings do not provide sump floor design detail. It has been assumed that these sump floors are basically flat concrete surfaces. If later proved otherwise, the sump leak channels and location of the leakage accumulation area can be modified for optimal leakage removal.

A leak chase system or leak accumulation system needs to be designed to assure proper leakage removal from the secondary containment area. The options are to modify the existing sump floor or to design, fabricate, and install a system to collect any leakage.

The simplest option would be to modify the existing sump floor. This would entail coring a 16 inch diameter by 1 inch to 4 inch deep section in the sump floor. This cored section will be referred to as the leakage accumulation area. The leakage accumulation area will provide a low point in the sump floors for leaked material to collect. Grooves extending radially from the

leakage accumulation area would be cut into the concrete floor. These channels would be approximately ½ inch wide and ½ inch deep. The grooves would direct leaked materials from the sump extremities to the accumulation area.

6.1.2 Sump VES-FT-534

The bottom 5 ft 6 in. of sump VES-FT-534 is lined with stainless steel. Channeling the sump floor for leakage accumulation, therefore, will not be possible. According to the available drawings, however, there is reason to believe that the sump floor is sloped. If sloped, the sump already has the necessary leakage accumulation capability.

6.2 Paint Sealant

A paint sealant will provide the secondary containment for the sumps not already lined with stainless steel and serve as an added safety and maintenance feature contributing to the sump integrity and reliability. Of the three sumps investigated, sump VES-FT-549, the Chemical Waste Sump receives the larger amount of hazardous materials, with nitric acid and sodium hydroxide being of primary concern. Thirteen (13) Molar (62%) nitric acid and/or nineteen (19) Molar (50%) sodium hydroxide are used in the water treatment process.

Before the hazardous material enters the sumps, the nitric acid and/or sodium hydroxide is diluted considerably with water. The probability of having straight 13 Molar nitric acid or 19 Molar sodium hydroxide enter the sump liners and then leak out into the secondary containment area is very slight; however, paint sealant selection assumes this worst case scenario for design and provides the required secondary containment. (See Appendix C for paint vendor information.)

6.3 Sump Liner Design

As discussed, Sentry Polymers, Inc. provide secondary containment liner systems. These systems are constructed of Semstone® coater products and are applicable to this project application. The Semstone liner materials are

currently being evaluated to determine their chemical resistivity and reliability. Alternative materials are being investigated. The Semstone® secondary containment design provides a false floor and false wall liner to provide primary containment and secondary containment with leakage detection and removal. (See Appendix D for secondary containment specifications.) The described conceptual design assumes Semstone® 870 is used.

The false floor is accomplished by first installing a 1-½ in. thick X 1-½ in. square mesh fiberglass grating on the sump floor. The grating is covered with a ⅛ in. fiberglass reinforced plastic (FRP) sheet that is factory molded to one side. The grating and the FRP sheet are then secured in place using concrete anchors with washers installed on 36 inch centers. Once secured, the installed FRP sheet will then be lined with polymer lining material, reinforced with 1.5 oz per square foot chopped strand fiberglass mat to a finished thickness of 125 mils. Grooves or bosses on the bottom of the grating allow liquid materials to travel across the secondary containment floor and prevent pooling.

The false walls are accomplished by fastening ⅛ in. thick fiberglass sheet to the walls using concrete anchors. Like in the floor installation, the concrete anchors are to be installed at each corner and one in the center of each panel. The installed fiberglass sheet will then be lined with Semstone® 870, reinforced with 1.5 oz per square foot chopped strand fiberglass mat to a finished thickness of 125 mils. The Semstone® 870 is not bonded directly to the sump concrete walls. Because of this, a separation between the secondary containment (sump concrete) and primary containment (liner) is provided allowing leaked materials to flow between the liner and the secondary containment (sump concrete) walls.

A leak detection/removal pipe (FRP) would be installed to provide access to the leakage accumulation area on the secondary containment floor. The pipe will be approximately 1 ft. in diameter allowing adequate space for a small pump and a leak detection device to be placed. The pipe will extend above the liner probably to the top of the sumps in the case of sumps VES-FT-548 and VES-FT-549.

6.3.1 Sump VES-FT-548 Liner Design

Sump VES-FT-548's dimensions are 5 ft 6 in. length X 5 ft 6 in. width X 8 ft 4 in. depth. A rectangular overflow weir enters the sump on the east side. The base of this weir is 36 in. from the top of the sump. The liner, therefore, would not need to extend more than six inches above the weir. The liner depth will then be approximately 5 ft 10 in. measured from the sump floor. The liner will not interfere with the overflow weir operations and will be sealed to the concrete surface around the top and in the weir area. The liner will cover approximately 160 ft^2 concrete surface area. The volumetric capacity of the sump up to the overflow weir is 176 ft^3. The liner will be capable of handling this volume of liquid.

A six inch pipe line enters the sump on the west side and exits the east side. This line does not discharge into the sump and simply passes through. The center of this pipe is approximately 39 in. from the top of the sump and will be an obstacle for liner fabrication. A pump and some various instrumentation are mounted on the metal sump cover and extend down into the sump. These items are not to be moved. The pump and instrumentation will be obstacles in liner fabrication. Figure 1 provides a sketch of sump VES-FT-548. The specifications for liner installation are outlined in Appendix D.

6.3.2 Sump VES-FT-549 Liner Design

Sump VES-FT-549 dimensions are 6 ft length X 6 ft width X 13 ft 8 in. depth. Overflow weirs enter the sump on the south side. The base of the lowest weir is approximately 37 in. from the top of the sump. The liner, therefore, will only extend approximately six inches above this weir. The liner depth will then be approximately 11 ft measured from the sump floor. The liner will cover approximately 300 ft^2 of sump concrete surface area.

Again, the liner will be sealed to the concrete surface around the top and in the weir area. As with sump VES-FT-548, a pump and instrumentation are mounted on the metal sump cover. These items extend down into the sump and are not to be altered if at all possible. Sump VES-FT-549 configuration is provided in Figure 1. See Appendix D for specifications.

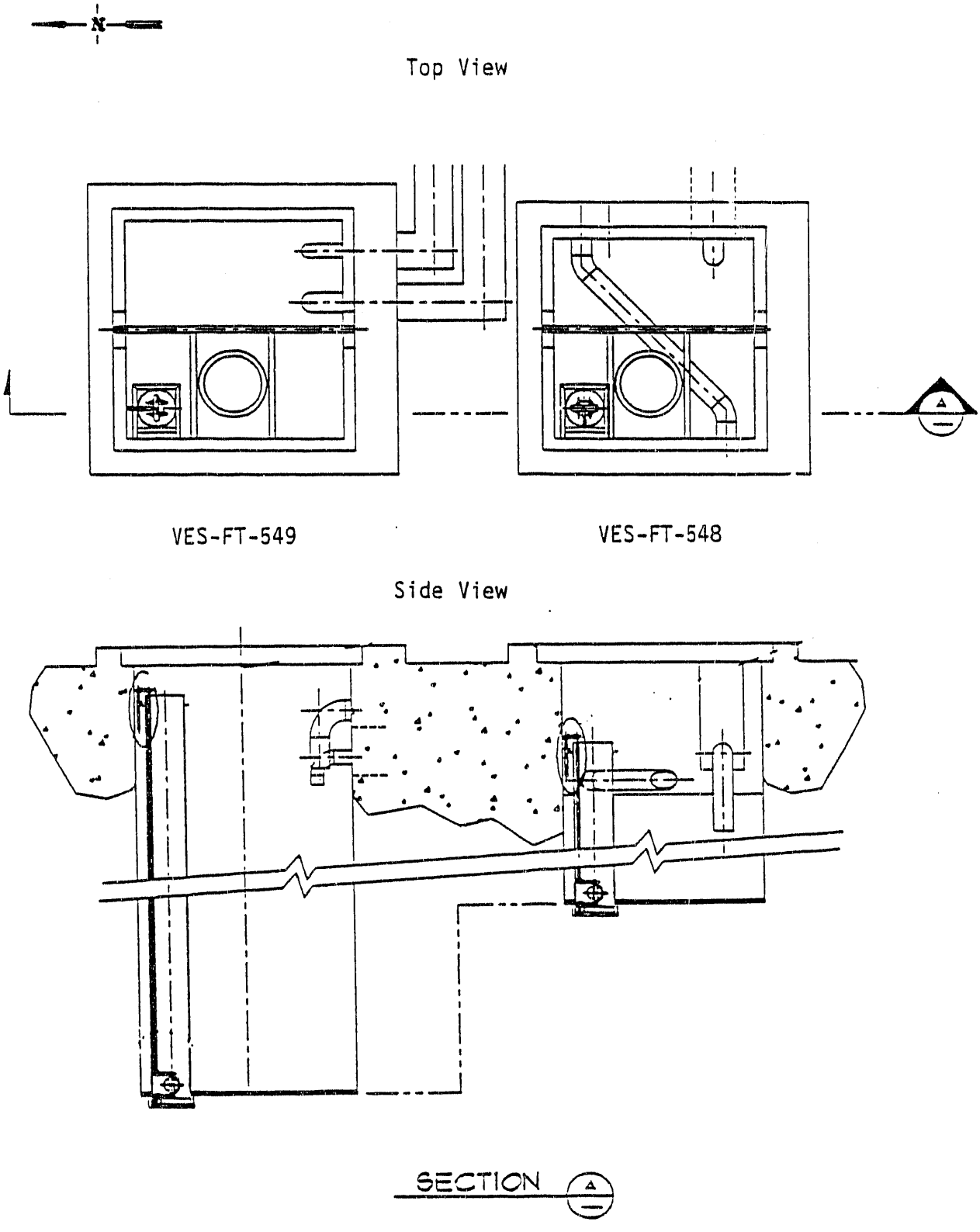


Figure 1. Sump VES-FT-548 and Sump VES-FT-549.
(With Secondary Containment/Leak Detection System)

6.3.3 Sump VES-FT-534 Liner Design

Not much detail is available on sump VES-FT-534. The available drawings are difficult to read and brought up sump configuration questions. It will be necessary to enter the sump to make field verification measurements and observations for subsequent designs. This sump is a zone III area and is covered with a concrete hatch. It is not known what instrumentation, pumps, lines, etc. exist. The drawings indicate that the bottom 5½ ft of the sump is lined with a stainless steel liner. Also, a rectangular channel (3 ft X 3 ft X 4 ft) at the base of sump VES-FT-534 possibly connects sump VES-FT-534 to an adjacent sump.

The overall dimensions of the sump are 4 ft length X 8 ft width X 26 ft depth. As mentioned, the bottom 5½ ft of the sump is already lined with stainless steel. For the purpose of this project and unless additional information is obtained, the new liner system will simply cover the existing stainless steel liner. As indicated, it will be necessary to enter the sump to make field verification observations and measurements for secondary containment design and construction. If later additional detail is found, the secondary containment design can be modified.

Even though the sump is already lined, it does not have a secondary containment leak detection or removal system. This feature is required by environmental regulations, since this sump contains hazardous and radioactive materials. The Semstone® secondary containment system can be installed on stainless steel. Figure 2 represents sump VES-FT-534 as indicated in the available drawings.

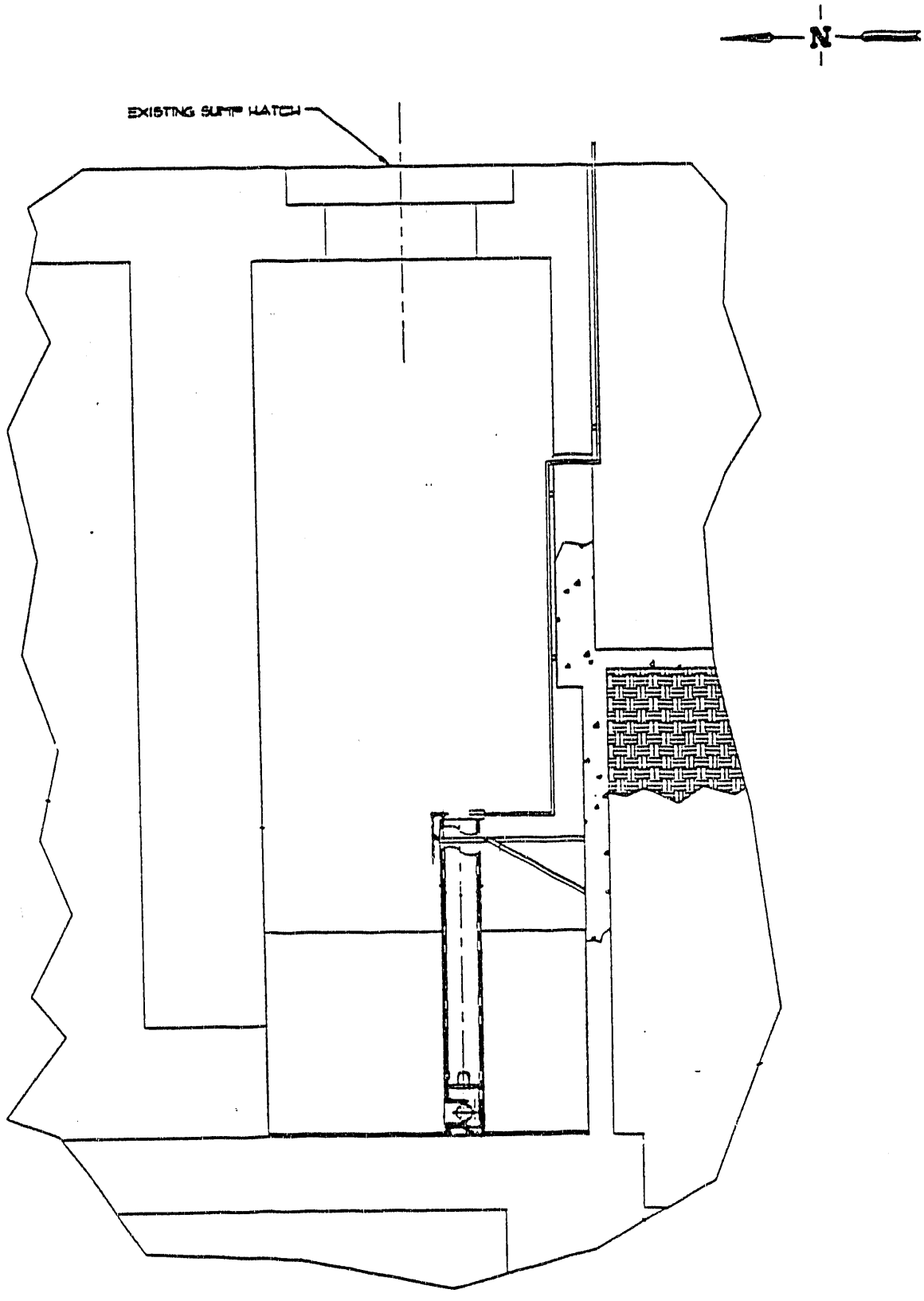


Figure 2. Sump VES-FT-534.

6.4 Pump and Piping

6.4.1 Pump Selection

In selecting an appropriate leak removal system, 40 CFR 265.193 (c)(4) was referenced. The pump must efficiently remove leakage from the primary containment. Two options were considered, electrical and air drive pump systems. The FAST facility has 100 psi air capability, and an air driven pump is the preferred option. Requirements for pump system are as follows:

1. Constructed of materials chemically inert and unreactive with sump contents, namely nitric acid, sodium hydroxide, and potential radioactive materials,
2. Capable of pumping at the selected total dynamic head (ft) for each sump,
3. Manually activated,
4. Efficient at removing primary containment leakage,
5. Explosion Proof,
6. Submersible,
7. Small as possible - minimize space or area required, and
8. Removable for maintenance purposes (no permanent base).
9. Preferably be able to pump with no water

Flow rate wasn't a critical design factor in pump selection. It was requested, however, that the pump have a capacity in the range of 2-10 gallons per minute (gpm).

It is important to note that the sumps are confined space areas. This is another limiting factor in pump selection. The equipment placed into or used in these areas should be explosion proof. If not, they should be properly ventilated to prevent a potential safety hazard. As long as air is available for use, the air operated pump is favored over the electric pump. The major advantages of the air operated pumps are: explosion proof, able to run dry continuously without pump damage, self priming, submersible, and more efficient at removing liquids since they don't require a significant heel of water. Appendix C provides vendor information.

6.4.2 Air Supply Piping

One hundred (100) pounds per square inch, gauge (psig) air is available in the FAST facility for pump operations. The recommended pumps for all three sump applications are air operated pumps with a ¼ in. air female NPT inlet. The air supply will be hard piped to the sump areas, valved, and then a ¼ in. plastic line will be connected to the pumps. The maximum air pressure the pumps can operate at is 125 psig. From calculations, the pumps would require an air supply pressure of approximately 30 psig to pump 5 gpm at 15 ft discharge head.

6.4.3 Flexible Discharge Line

The leak detection pipe of the secondary containment system provides the only access to the leakage accumulation area. The leakage removal pump will sit down in the leak accumulation area on the sump floor. In order to service the pump, the pump must be pulled up through the leak detection pipe from the top of the sumps. The pump, therefore, can not be permanently attached to the sump floor. Because of this, vibration or slight movement of the pump may occur. This vibration along with the length of the leak detection pipe introduces some problems with having rigid discharge piping or tubing.

Rigid discharge or outlet piping would likely require additional piping supports. The pump could not support the entire span of the discharge pipe, especially since it is not secured to the sump floor. Pipe supports inside the leak detection pipe would be necessary, and they would make it difficult to remove the pump and piping for maintenance and servicing purposes.

One half (½) in. diameter flexible hose is recommended as the pump discharge or outlet line. The flexible line would run from the pump up through the leak detection pipe and direct discharge back into the primary containment. The flexible hose would be better suited to accommodate vibration, movement of the pump, and installation and removal.

6.5 Electrical and Instrumentation

The leak detection system will be designed and operated so that is will detect any release of hazardous material waste or accumulated liquid in the secondary containment system within 24 hours (RCRA 40 CFR 265.193 (c)(3)). A leak detection device will be installed in the leak detection pipe of each sump. The detector will be able to sense the presence of fluid in the leakage accumulation area in the secondary containment (sump floor) and provide an alarming system with both a visual and an auditory alarm. The leak detection device will be serviceable from the top of the sump. One hundred twenty (120) volt electrical supply is available for the sump instrumentation. The leak detector will be able to detect ½ - 1 inch leakage accumulation in the sump leakage accumulation area.

The recommended leak detection system has both visual and auditory alarm capability, and the single unit can be used for all three sumps. The leak detection system will alarm at LCP-21 for sumps VES-FT-548 and VES-FT-549 and at LCP-22 for sump VES-FT-534. See Appendix C for vendor information.

7. OPERATIONS TESTING AND QUALITY CONTROL

WINCO personnel will be responsible for the safety analysis evaluating the design, construction, and operation of the primary containment sump liner/leak detection systems. Preliminary and periodic testing of the leak detection alarming and pumping system will be performed at the discretion of WINCO maintenance personnel. The design will be conducive to testing. The quality control specifications are outlined in Appendix D. The quality control inspection includes but is not limited to the following (based on use of Semstone 870):

(1) Inspect the initial paint coating in accordance with coating specifications prior to primary containment installation.

(2) Visually inspect the covered grating installation on the floors and fiberglass sheet on the walls for proper anchoring.

(3) Physically inspect spaces between grating/panels Spaces are not to exceed ¼ in. at any interface, including concrete walls.

(4) Visually inspect surface preparation of fiberglass sheet to ensure that all glaze is removed and that the profile is similar to rough sandpaper.

(5) Visually inspect that all corners have received a proper radius with Semstone® 805 Flexible Epoxy prior to proceeding with lining application of Semstone® 870.

(6) Visually inspect completed lined pit. Reasons for rejection are as follows:

A. Pinholes in lining.
B. Uncured material.
C. Foreign inclusions in cured lining.
D. Inadequate thickness.
E. Use of materials not authorized in specifications.
F. Exposed reinforcement/unwet mat.
G. Wrinkles or hollow spots in lining.
H. Unauthorized variance from the specifications.

(7) The new sump liner will be vacuum box tested for leaks.

(8) The sump liner will be filled and monitored for leaks.

8. EQUIPMENT DESCRIPTION

The major components and associated price estimations recommended for this project design are provided in Table 2. This estimation does not include any manhours for labor, training, inspection, safety, design, or reviews.

Table 2. Cost Estimations per Component.

	VES-FT-548	VES-FT-549	VES-FT-534
Air Operated Pump	$840	$840	$840
Flexible Discharge hose (½ in.)	$130	$220	$100
Air Supply Line (¼ in.)	$30	$40	$70
Air Supply Steel Pipe and Fittings	$80	$80	$60
Leak Detector and alarm	$600	$600	$800
Flexible Hose Connect, fittings, valves	$60	$60	$60
Paint Sealant	$160[a]	$290[a]	$180[a]
Secondary Containment System	$2,440[a,b]	$4,220[a,b]	$2,670[a,b]
Concrete Cutting for Leakage Accumulation	$1,500	$1,500	N/A
Total	$5,840	$7,850	$4,780

a. See Appendix E. for paint sealant and secondary containment system material cost estimate calculations. Note, these costs are only approximations made from available information.

b. For secondary containment system cost estimations, Sentry Polymers, Inc. lining system was used. This estimate includes, grating, panels, fiberglass, Semstone® 870 chemical resistant coating, 1 ft diameter leak detection pipe, and Semstone® 8084 primer. Hilti Anchors were not included in this estimate.

9. CONCLUSIONS

The recommended secondary containment design installs a chemical resistant lining system. The recommended lining system installation will be relatively inexpensive and result in minimum down time of sump operations. It will also be easier to install than a stainless steel liner considering the confined space and various piping obstacles present in each sump.

The secondary containment/leak detection system design satisfies the RCRA 40 CFR 265.193 requirements for hazardous material containments. It provides a leak detection and leak removal system via a leak detection pipe and provides for efficient leakage accumulation on the secondary containment (sump) floor. A space between the secondary containment floor and the primary containment liner allows leaked liquids to collect. The liner is not bonded directly to the sump walls. This provides a separation between the primary containment and secondary containment allowing liquids leaked from the primary containment (liner walls) to flow to the secondary containment floor for detection and removal. As mentioned, the currently recommended primary containment material (Semstone®) is being tested for its chemical inertness. Alternative primary containment liner materials are being investigated in the event the Semstone® lining materials are found unsuitable.

Conceptual designs have been made using the available information collected from drawings, conversations, and site visits. Additional detail, especially for sump VES-FT-534, will be necessary for the Title II designs.

APPENDIX A.

Resource and Recovery Act (RCRA)
40 Code of Federal Regulations (CFR) 265.193
Containment and detection of releases.

written statements by those persons required to certify the design of the tank system and supervise the installation of the tank system in accordance with the requirements of paragraphs (b) through (f) of this section to attest that the tank system was properly designed and installed and that repairs, pursuant to paragraphs (b) and (d) of this section were performed. These written statements must also include the certification statement as required in § 270.11(d) of this chapter.

(Information collection requirements contained in paragraphs (a) and (g) were approved by the Office of Management and Budget under control number 2050-0050)

[51 FR 25479, July 14, 1986; 51 FR 29430, Aug. 15, 1986]

§ 265.193 Containment and detection of releases.

(a) In order to prevent the release of hazardous waste or hazardous constituents to the environment, secondary containment that meets the requirements of this section must be provided (except as provided in paragraphs (f) and (g) of this section):

(1) For all new tank systems or components, prior to their being put into service;

(2) For all existing tanks used to store or treat EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027, within two years after January 12, 1987;

(3) For those existing tank systems of known and documentable age, within two years after January 12, 1987, or when the tank systems have reached 15 years of age, whichever comes later;

(4) For those existing tank system for which the age cannot be documented, within eight years of January 12, 1987; but if the age of the facility is greater than seven years, secondary containment must be provided by the time the facility reaches 15 years of age, or within two years of January 12, 1987, whichever comes later; and

(5) For tank systems that store or treat materials that become hazardous wastes subsequent to January 12, 1987, within the time intervals required in paragraphs (a)(1) through (a)(4) of this section, except that the date that a material becomes a hazardous waste must be used in place of January 12, 1987.

(b) Secondary containment systems must be:

(1) Designed, installed, and operated to prevent any migration of wastes or accumulated liquid out of the system to the soil, ground water, or surface water at any time during the use of the tank system; and

(2) Capable of detecting and collecting releases and accumulated liquids until the collected material is removed.

(c) To meet the requirements of paragraph (b) of this section, secondary containment systems must be at a minimum:

(1) Constructed of or lined with materials that are compatible with the waste(s) to be placed in the tank system and must have sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrological forces), physical contact with the waste to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation (including stresses from nearby vehicular traffic);

(2) Placed on a foundation or base capable of providing support to the secondary containment system and resistance to pressure gradients above and below the system and capable of preventing failure due to settlement, compression, or uplift;

(3) Provided with a leak detection system that is designed and operated so that it will detect the failure of either the primary and secondary containment structure or any release of hazardous waste or accumulated liquid in the secondary containment system within 24 hours, or at the earliest practicable time if the existing detection technology or site conditions will not allow detection of a release within 24 hours;

(4) Sloped or otherwise designed or operated to drain and remove liquids resulting from leaks, spills, or precipitation. Spilled or leaked waste and accumulated precipitation must be removed from the secondary containment system within 24 hours, or in as timely a manner as is possible to prevent harm to human health or the en-

e is diluted considerably with water. The probability of having
13 Molar nitric acid or 19 Molar sodium hydroxide enter the sump
nd then leak out into the secondary containment area is very slight;
paint sealant selection assumes this worst case scenario for design
ides the required secondary containment. (See Appendix C for paint
nformation.)

6.3 Sump Liner Design

ıssed, Sentry Polymers, Inc. provide secondary containment liner
These systems are constructed of Semstone® coater products and are
ıle to this project application. The Semstone liner materials are

containment (sump concrete) and primary containment (liner) is provide
allowing leaked materials to flow between the liner and the secondary
containment (sump concrete) walls.

A leak detection/removal pipe (FRP) would be installed to provide access to the leakage accumulation area on the secondary containment floor. The pipe will be approximately 1 ft. in diameter allowing adequate space for a small pump and a leak detection device to be placed. The pipe will extend above the liner probably to the top of the sumps in the case of sumps VES-FT-548 and VES-FT-549.

vironment, if removal of the released waste or accumulated precipitation cannot be accomplished within 24 hours.

NOTE: If the collected material is a hazardous waste under Part 261 of this chapter, it is subject to management as a hazardous waste in accordance with all applicable requirements of Parts 262 through 265 of this chapter. If the collected material is discharged through a point source to waters of the United States, it is subject to the requirements of sections 301, 304, and 402 of the Clean Water Act, as amended. If discharged to Publicly Owned Treatment Works (POTWs), it is subject to the requirements of section 307 of the Clear Water Act, as amended. If the collected material is released to the environment, it may be subject to the reporting requirements of 40 CFR Part 302.

(d) Secondary containment for tanks must include one or more of the following devices:

(1) A liner (external to the tank);

(2) A vault;

(3) A double-walled tank; or

(4) An equivalent device as approved by the Regional Administrator.

(e) In addition to the requirements of paragraphs (b), (c), and (d) of this section, secondary containment systems must satisfy the following requirements:

(1) External liner systems must be:

(i) Designed or operated to contain 100 percent of the capacity of the largest tank within its boundary;

(ii) Designed or operated to prevent run-on or infiltration of precipitation into the secondary containment system unless the collection system has sufficient excess capacity to contain run-on or infiltration. Such additional capacity must be sufficient to contain precipitation from a 25-year, 24-hour rainfall event;

(iii) Free of cracks or gaps; and

(iv) Designed and installed to completely surround the tank and to cover all surrounding earth likely to come into contact with the waste if released from the tank(s) (i.e., capable of preventing lateral as well as vertical migration of the waste).

(2) Vault systems must be:

(i) Designed or operated to contain 100 percent of the capacity of the largest tank within its boundary;

(ii) Designed or operated to prevent run-on or infiltration of precipitation into the secondary containment system unless the collection system has sufficient excess capacity to contain run-on or infiltration. Such additional capacity must be sufficient to contain precipitation from a 25-year, 24-hour rainfall event;

(iii) Constructed with chemical-resistant water stops in place at all joints (if any);

(iv) Provided with an impermeable interior coating or lining that is compatible with the stored waste and that will prevent migration of waste into the concrete;

(v) Provided with a means to protect against the formation of and ignition of vapors within the vault, if the waste being stored or treated:

(A) Meets the definition of ignitable waste under § 262.21 of this chapter, or

(B) Meets the definition of reactive waste under § 262.21 of this chapter and may form an ignitable or explosive vapor; and

(vi) Provided with an exterior moisture barrier or be otherwise designed or operated to prevent migration of moisture into the vault if the vault is subject to hydraulic pressure.

(3) Double-walled tanks must be:

(i) Designed as an integral structure (i.e., an inner tank within an outer shell) so that any release from the inner tank is contained by the outer shell;

(ii) Protected, if constructed of metal, from both corrosion of the primary tank interior and the external surface of the outer shell; and

(iii) Provided with a built-in, continuous leak detection system capable of detecting a release within 24 hours or at the earliest practicable time, if the owner or operator can demonstrate to the Regional Administrator, and the Regional Administrator concurs, that the existing leak detection technology or site conditions will not allow detection of a release within 24 hours.

NOTE: The provisions outlined in the Steel Tank Institute's (STI) "Standard for Dual Wall Underground Steel Storage Tank" may be used as guidelines for aspects of the design of underground steel double-walled tanks.

(f) Ancillary equipment must be provided with full secondary containment (e.g., trench, jacketing, double-walled piping) that meets the requirements of paragraphs (b) and (c) of this section except for:

(1) Aboveground piping (exclusive of flanges, joints, valves, and connections) that are visually inspected for leaks on a daily basis;

(2) Welded flanges, welded joints, and welded connections that are visually inspected for leaks on a daily basis;

(3) Sealless or magnetic coupling pumps and sealless valves, that are visually inspected for leaks on a daily basis; and

(4) Pressurized aboveground piping systems with automatic shut-off devices (e.g., excess flow check valves, flow metering shutdown devices, loss of pressure actuated shut-off devices) that are visually inspected for leaks on a daily basis.

(g) The owner or operator may obtain a variance from the requirements of this Section if the Regional Administrator finds, as a result of a demonstration by the owner or operator, either: that alternative design and operating practices, together with location characteristics, will prevent the migration of hazardous waste or hazardous constituents into the ground water or surface water at least as effectively as secondary containment during the active life of the tank system or that in the event of a release that does migrate to ground water or surface water, no substantial present or potential hazard will be posed to human health or the environment. New underground tank systems may not, per a demonstration in accordance with paragraph (g)(2) of this section, be exempted from the secondary containment requirements of this section. Application for a variance as allowed in paragraph (g) of this section does not waive compliance with the requirements of this subpart for new tank systems. (1) In deciding whether to grant a variance based on a demonstration of equivalent protection of ground water and surface water, the Regional Administrator will consider:

(i) The nature and quantity of the waste;

(ii) The proposed alternate design and operation;

(iii) The hydrogeologic setting of the facility, including the thickness of soils between the tank system and ground water; and

(iv) All other factors that would influence the quality and mobility of the hazardous constituents and the potential for them to migrate to ground water or surface water.

(2) In deciding whether to grant a variance, based on a demonstration of no substantial present or potential hazard, the Regional Administrator will consider:

(i) The potential adverse effects on ground water, surface water, and land quality taking into account:

(A) The physical and chemical characteristics of the waste in the tank system, including its potential for migration,

(B) The hydrogeological characteristics of the facility and surrounding land,

(C) The potential for health risks caused by human exposure to waste constituents,

(D) The potential for damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents, and

(E) The persistence and permanence of the potential adverse effects;

(ii) The potential adverse effects of a release on ground-water quality, taking into account:

(A) The quantity and quality of ground water and the direction of ground-water flow,

(B) The proximity and withdrawal rates of water in the area,

(C) The current and future uses of ground water in the area, and

(D) The existing quality of ground water, including other sources of contamination and their cumulative impact on the ground-water quality;

(iii) The potential adverse effects of a release on surface water quality, taking into account:

(A) The quantity and quality of ground water and the direction of ground-water flow,

(B) The patterns of rainfall in the region,

.3-FT-549 dimensions are 6 ft length x 6 ft width x 13 ft 8 in. depth. low weirs enter the sump on the south side. The base of the lowest weir proximately 37 in. from the top of the sump. The liner, therefore, will extend approximately six inches above this weir. The liner depth will be approximately 11 ft measured from the sump floor. The liner will approximately 300 ft^2 of sump concrete surface area.

, the liner will be sealed to the concrete surface around the top and in eir area. As with sump VES-FT-548, a pump and instrumentation are ed on the metal sump cover. These items extend down into the sump and ot to be altered if at all possible. Sump VES-FT-549 configuration is ied in Figure 1. See Appendix D for specifications.

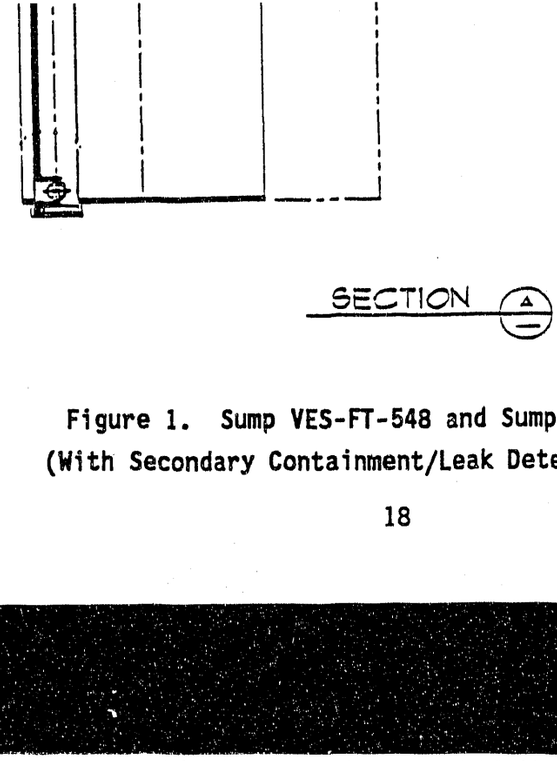


Figure 1. Sump VES-FT-548 and Sump VES-FT-549.
(With Secondary Containment/Leak Detection System)

(C) The proximity of the tank system to surface waters,

(D) The current and future uses of surface waters in the area and any water quality standards established for those surface waters, and

(E) The existing quality of surface water, including other sources of contamination and the cumulative impact on surface-water quality; and

(iv) The potential adverse effects of a release on the land surrounding the tank system, taking into account:

(A) The patterns of rainfall in the region, and

(B) The current and future uses of the surrounding land.

(3) The owner or operator of a tank system, for which a variance from secondary containment had been granted in accordance with the requirements of paragraph (g)(1) of this section, at which a release of hazardous waste has occurred from the primary tank system but has not migrated beyond the zone of engineering control (as established in the variance), must:

(i) Comply with the requirements of § 265.196, except paragraph (d); and

(ii) Decontaminate or remove contaminated soil to the extent necessary to:

(A) Enable the tank system, for which the variance was granted, to resume operation with the capability for the detection of and response to releases at least equivalent to the capability it had prior to the release, and

(B) Prevent the migration of hazardous waste or hazardous constituents to ground water or surface water; and

(iii) If contaminated soil cannot be removed or decontaminated in accordance with paragraph (g)(3)(ii) of this section, comply with the requirements of § 265.197(b);

(4) The owner or operator of a tank system, for which a variance from secondary containment had been granted in accordance with the requirements of paragraph (g)(1) of this section, at which a release of hazardous waste has occurred from the primary tank system and has migrated beyond the zone of engineering control (as established in the variance), must:

(i) Comply with the requirements of § 265.196(a), (b), (c), and (d); and

(ii) Prevent the migration of hazardous waste or hazardous constituents to ground water or surface water, if possible, and decontaminate or remove contaminated soil. If contaminated soil cannot be decontaminated or removed, or if ground water has been contaminated, the owner or operator must comply with the requirements of § 265.197(b);

(iii) If repairing, replacing, or reinstalling the tank system, provide secondary containment in accordance with the requirements of paragraphs (a) through (f) of this section or reapply for a variance from secondary containment and meet the requirements for new tank systems in § 265.192 if the tank system is replaced. The owner or operator must comply with these requirements even if contaminated soil can be decontaminated or removed, and ground water or surface water has not been contaminated.

(h) The following procedures must be followed in order to request a variance from secondary containment:

(1) The Regional Administrator must be notified in writing by the owner or operator that he intends to conduct and submit a demonstration for a variance from secondary containment as allowed in paragraph (g) of this section according to the following schedule:

(i) For existing tank systems, at least 24 months prior to the date that secondary containment must be provided in accordance with paragraph (a) of this section; and

(ii) For new tank systems, at least 30 days prior to entering into a contract for installation of the tank system.

(2) As part of the notification, the owner or operator must also submit to the Regional Administrator a description of the steps necessary to conduct the demonstration and a timetable for completing each of the steps. The demonstration must address each of the factors listed in paragraph (g)(1) or paragraph (g)(2) of this section.

(3) The demonstration for a variance must be completed and submitted to the Regional Administrator within 180 days after notifying the Regional Administrator of intent to conduct the demonstration.

(4) The Regional Administrator will inform the public, through a newspaper notice, of the availability of the demonstration for a variance. The notice shall be placed in a daily or weekly major local newspaper of general circulation and shall provide at least 30 days from the date of the notice for the public to review and comment on the demonstration for a variance. The Regional Administrator also will hold a public hearing, in response to a request or at his own discretion, whenever such a hearing might clarify one or more issues concerning the demonstration for a variance. Public notice of the hearing will be given at least 30 days prior to the date of the hearing and may be given at the same time as notice of the opportunity for the public to review and comment on the demonstration. These two notices may be combined.

(5) The Regional Administrator will approve or disapprove the request for a variance within 90 days of receipt of the demonstration from the owner or operator and will notify in writing the owner or operator and each person who submitted written comments or requested notice of the variance decision. If the demonstration for a variance is incomplete or does not include sufficient information, the 90-day time period will begin when the Regional Administrator receives a complete demonstration, including all information necessary to make a final determination. If the public comment period in paragraph (h)(4) of this section is extended, the 90-day time period will be similarly extended.

(i) All tank systems, until such time as secondary containment meeting the requirements of this section is provided, must comply with the following:

(1) For non-enterable underground tanks, a leak test that meets the requirements of § 265.191(b)(5) must be conducted at least annually;

(2) For other than non-enterable underground tanks and for all ancillary equipment, an annual leak test, as described in paragraph (i)(1) of this section, or an internal inspection or other tank integrity examination by an independent, qualified, registered professional engineer that addresses cracks, leaks, corrosion, and erosion must be conducted at least annually. The owner or operator must remove the stored waste from the tank, if necessary, to allow the condition of all internal tank surfaces to be assessed.

NOTE: The practices described in the American Petroleum Institute (API) Publication Guide for Inspection of Refining Equipment, Chapter XIII, "Atmospheric and Low Pressure Storage Tanks," 4th edition, 1981, may be used, when applicable, as guidelines for assessing the overall condition of the tank system.

(3) The owner or operator must maintain on file at the facility a record of the results of the assessments conducted in accordance with paragraphs (i)(1) through (i)(3) of this section.

(4) If a tank system or component is found to be leaking or unfit-for-use as a result of the leak test or assessment in paragraphs (i)(1) through (i)(3) of this section, the owner or operator must comply with the requirements of § 265.196.

(Information collection requirements contained in paragraphs (c)–(e) and (g)–(i) were approved by the Office of Management and Budget under control number 2050–0050)

[51 FR 25479, July 14, 1986; 51 FR 29430, Aug. 15, 1986, as amended at 53 FR 34087, Sept. 2, 1988]

§ 265.194 General operating requirements.

(a) Hazardous wastes or treatment reagents must not be placed in a tank system if they could cause the tank, its ancillary equipment, or the secondary containment system to rupture, leak, corrode, or otherwise fail.

(b) The owner or operator must use appropriate controls and practices to prevent spills and overflows from tank or secondary containment systems. These include at a minimum:

(1) Spill prevention controls (e.g., check valves, dry discount couplings);

(2) Overfill prevention controls (e.g., level sensing devices, high level alarms, automatic feed cutoff, or bypass to a standby tank); and

(3) Maintenance of sufficient freeboard in uncovered tanks to prevent overtopping by wave or wind action or by precipitation.

(c) The owner or operator must comply with the requirements of

APPENDIX B.

WINCO Safety Approval for
Secondary Containment System.

To: Jim Downes, N&IS

From: T.H. Waite TH Waite

April 29, 1992

Subject: Use of Semstone 870

Permission is requested to use Semstone 870, manufactured by Sentry Polymers, Inc. It is to be used for the fabrication of secondary containment liners FAST-FT-534/548/549.

The sumps being lined are located below grade level, and require secondary containment due to the liquids that are collected in the sumps. Semstone 870 is compatible with the chemicals that are collected in these sumps. No other coatings of this type have been found that are compatible with the chemicals being collected.

The MSDS sheets for Semstone 870 are attached. It shows that one of the components, Part A, contains styrene, which is a potential carcinogen.

Your permission to use Semstone 870 for this particular application is requested. If there are any questions, please contact me at 6-3699.

Permission is given to use Semstone 870 for secondary containment for the Fast sumps.

Jim Downes 5/5/92

Jim Downes, N&IS

APPENDIX C.

Vendor Information:
(paint sealants and liner secondary containment materials,
air operated pumps, and leak detection devices)

TECHNICAL BULLETIN
September 1990

SEMSTONE® 870

Reinforced Vinyl Ester Coating/Lining System

DESCRIPTION AND USES:

SEMSTONE 870 is a Sentry's vinyl ester lining system for protecting concrete.

It is normally chosen for its exceptional resistance to certain difficult chemicals, such as nitric acid, acetic acid, chlorine and hypochlorites.

SEMSTONE 870 is applied by roller or brush, reinforced with Sentry's fiberglass scrim cloth, and aggregate filled by the broadcast method, to yield a system with a finished thickness of approximately 1/8 inch.

PACKAGING/COVERAGE:

SEMSTONE 870 is available in 1 gallon and 5 gallon units. Each unit consists of a premeasured Part A component and a premeasured Part B component. A bagged Part C thixotropic agent is added for work on vertical surfaces.

Coverage rates are affected by the condition of the surface being coated. Over new concrete that has been properly prepared and primed, figure THEORETICAL coverage rates at 20 square feet per gallon. For PRACTICAL coverage, make necessary allowances for condition of the substrate, working conditions, waste, spillage, etc.

Allow one-half pound of aggregate per square foot, on horizontal surfaces.

Use only clean, dry bagged 20/40 mesh silica aggregate containing not less than 97.5% silicon dioxide (such as that produced by the Ottawa Silica Company, Ottawa, Illinois.)

Sentry POLYMERS INC.
P. O. BOX 2076A
5500 E. HWY 332 409-233-0312
FREEPORT, TX 77541 800-231-2544

WORKING PROPERTIES:

Pot Life @ 75°F	30 minutes
(significantly less at elevated temperatures or in direct sunlight)	
Cure Time @ 75°F:	
Foot traffic	12 hrs.
Light vehicular traffic	24 hrs.
Chemical service	48 hrs.
Primer	SEMSTONE 8084 Primer
Color	Gray

RELATED AND ANCILLARY PRODUCTS:

SEMSTONE 8084 Vinyl Ester Primer
SEMSTONE 8084 Vinyl Ester Putty
SEMSTONE 884 Vinyl Ester Polymer Concrete
SEM-CRETE Rapid Hardening Underlayment Mortar

Refer to separate data sheet on each product for its uses, application instructions, etc.

STORAGE AND SHELF LIFE:

Keep SEMSTONE 870 components tightly sealed in their original containers until ready for use.

Store at 50°F - 60°F, out of direct sunlight.

Part A is flammable. Do not store near open flame, sparks or heat.

It is critical that the scrim cloth be kept in dry storage at all times. Otherwise, it may absorb atmospheric moisture and be rendered unusable with the system

Use SEMSTONE 870 within three months of date of manufacture. Refer to batch number on label for date of manufacture.

Due to their limited shelf lives, Sentry will not accept returns of vinyl ester products. Please order carefully.

CHEMICAL RESISTANCE GUIDE

This guide is intended as an aid in determining the potential usefulness of SEMSTONE 870 as a protective barrier against chemical exposure. Each application should be evaluated according to its particular circumstances and conditions.

KEY: 1 = Suitable for constant immersion
2 = Suitable for shorter term containment and continual spillage
3 = Suitable for intermittent spills when followed promptly with water flushing
NR = Not recommended
* = This chemical will attack the silica aggregate in the system. When the system is applied, be especially careful that all aggregate is totally encapsulated with SEMSTONE 870.

	RATING		RATING		RATING
Acetic Acid, 10%	1	Copper Chloride	1	Naphtha	1
Acetic Acid, 30%	1	Copper Cyanide	1	Naphthalene	1
Acetic Acid, Glacial	2	Copper Nitrate	1	Nitric Acid, 5%	1
Acrylic Acid, up to 25%	2	Copper Sulfate	1	Nitric Acid, 30%	2
Alum		Corn Oil	1	Nitric Acid, 50%	3
(Aluminum Potassium Sulfate)	1	Cyclohexane	2	Nitrobenzene	NR
Aluminum Chloride	1	Cyclohexanol	2	n-Octyl Alcohol	1
Aluminum Fluoride	1*	Cyclohexanone	2	Oils	1
Aluminum Hydroxide	2	Dichlorobenzene	NR	Oleic Acid	1
Aluminum Nitrate	1	Ethyl Benzene	NR	Oxalic Acid	1
Aluminum Sulfate	1	Ethyl Chloride	NR	Phenol	NR
Ammonia	2	Ethylene Dichloride	NR	Phosphoric Acid, 50%	1
Ammonium Bisulfite	1	Ethylene Glycol	1	Phosphoric Acid, 85%	1
Ammonium Chloride	1	Fatty Acids	1	Phosphorous Acid	3
Ammonium Hydroxide	2	Ferric Chloride	1	Potassium Carbonate	1*
Ammonium Nitrate	1	Ferric Nitrate	1	Potassium Chloride	1
Ammonium Sulfate	1	Ferric Sulfate	1	Potassium Dichromate	1
n-Amyl Alcohol	2	Ferrous Chloride	1	Potassium Hydroxide	2
Aniline	NR	Fluosilicic Acid	1*	Potassium Nitrate	1
Barium Chloride	1	Formaldehyde	3	Silver Nitrate	1
Barium Hydroxide	2	Formic Acid	2	Sodium Acetate	1
Barium Sulfate	1	Fuel Oil	1	Sodium Bicarbonate	1*
Barium Sulfide	1	Glycerine	1	Sodium Bisulfate	1
Benzene	NR	Heptane	1	Sodium Bisulfite	1
Benzene Sulfonic Acid	2	Hexane	2	Sodium Carbonate	1*
Benzoic Acid	1	Hydrobromic Acid	2	Sodium Chloride	1
Black Liquor, Pulp Mill	1	Hydrochloric Acid, 15%	1	Sodium Chlorite	2
Bleach Liquor, Pulp Mill	1*	Hydrochloric Acid, 37%	2	Sodium Hydroxide, 10%	2
Boric Acid	1	Hydrofluoric Acid	1*	Sodium Hydroxide, 50%	2
Brine	1	Hydrogen Peroxide	2	Sodium Hypochlorite	1*
Bromine, Liquid	NR	Hydrogen Sulfide	2	Sodium Sulfate	1
Bromine Gas (Dry & Wet)	2	Jet Fuel	1	Sodium Sulfide	1
n-Butyl Alcohol	3	Kerosene	1	Stannic Chloride	1
Butyl Cellosolve Solvent	2	Lactic Acid	1	Stannous Chloride	1
n-Butyric Acid	2	Lauryl Chloride	2	Stearic Acid	1
Cadmium Chloride	1	Lead Acetate	1	Sugar/Sucrose	1
Calcium Chloride	1	Linseed Oil	1	Sulfur Dioxide	1
Calcium Hydroxide	2	Lithium Bromide	1	Sulfuric Acid, 10%	1
Calcium Hypochlorite	1*	Lithium Chloride	1	Sulfuric Acid, 50%	1
Calcium Nitrate	1	Lithium Hypochlorite	1*	Sulfuric Acid, 98%	NR
Calcium Sulfate	1	Lithium Hydroxide	2	Tall Oil	1
Calcium Sulfite	2	Magnesium Bisulfite	1	Tannic Acid	1
Carbon Dioxide Gas	1	Magnesium Carbonate	1	Tartaric Acid	1
Carbon Dissulfide	NR	Magnesium Chloride	1	Toluene Sulfonic Acid	2
Carbon Tetrachloride	3	Magnesium Hydroxide	2	Trichloracetic Acid	2
Chlorine Dioxide	1	Magnesium Sulfate	1	Trichloroethylene	NR
Chlorine Gas (Dry & Wet)	1	Maleic Acid	1	Trisodium Phosphate	1
Chlorine Water	1	Mercuric Chloride	1	Urea	2
Chlorobenzene	NR	Mercurous Chloride	1	Water, Deionized	1
Chloroform	NR	Methyl Chloride	NR	Water, Demineralized	1
Chromic Acid, 15%	2	Methylene Chloride	NR	Water, Distilled	1
Chromic Acid, 50%	NR	Mineral Spirits	2	Zinc Chloride	1
Citric Acid	1	Monochloroacetic Acid	NR	Zinc Sulfate	1

5 pgs

0902

MISCO INC.
7544 Lemhi Street, #2
Boise, Idaho 83709-2837
(208) 323-0505
Fax No. (208) 376-9824

QUOTATION

Date: 04-10-92

Quotation #: 041092-72-6333

Ref: LEAKAGE PUMPS

E.G. & G. OF IDAHO
P.O. BOX 1625
IDAHO FALLS, ID 83415

ATTENTION: KELLY GALLOWAY

Item	Qty.	Description	Price Each
		MISCO WOULD LIKE TO OFFER THE FOLLOWING RECOMMENDATIONS FOR YOUR LEAKAGE PUMPS:	
1	1 EACH	OPTION #1 AMERICAN PUMP MODEL "BRUISER" OF SOLID TEFLON CONSTRUCTION 1/2" SIZE TO HANDLE 0-12 GPM FLOWRATE (MANUALLY ADJUSTABLE THROUGH CONTROL OF AIR SUPPLY). F.O.B.: SPRINGFIELD, MA DELIVERY: 2-3 WEEKS	$1,550.0
* 2	1 EACH	OPTION #2 WILDEN PUMP MODEL M1/ST/TF/TF/ST STAINLESS STEEL PUMP WITH TEFLON ELASTOMERS 1/2" SIZE TO HANDLE 0-12 GPM FLOWRATE (MANUALLY ADJUSTABLE THROUGH CONTROL OF AIR SUPPLY). F.O.B.: COLTON, CA DELIVERY: 2-3 WEEKS	$ 830.0

This quotation subject to our standard conditions of sale on the back side of this page.

Estimated shipping date SEE PROPOSAL after receipt of acceptance of this quotation.

F.O.B. SEE PROPOSAL

Terms NET 30 DAYS

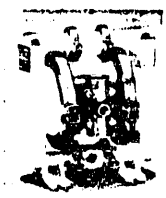
This quotation good for 30 days.

MISCO INC.

By Kavie D. Mc

SPECIFICATIONS AND PERFORMANCE

WILDEN® MODEL M-1®



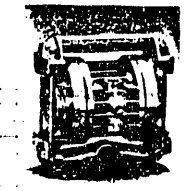
Height ..... 8½" Air Inlet ... ¼" Female NPT Suction Lift ... POLY. 15' Dry
Width ..... 8" Inlet ..... ½" Female NPT POLY. 25' Wet
Depth ..... 6½" Outlet ..... ½" Female NPT TEFLON 8' Dry
Weight ..... POLY. 8 lbs. Max. Size Solids ... 1/16" Dia. TEFLON 25' Primed

Example: *To pump 4 gpm against a discharge pressure of 40 psig requires 60 psig and 2 scfm air consumption. (See dot on chart.)*

Caution: Do not exceed 100 psig air supply pressure.

$ 840

WILDEN® MODEL M-2®



Height ..... 10½" Air Inlet ..... ¼" NPT Suction Lift ..... 18' Dry
Width ..... 10½" Inlet ..... 1" Male NPT 25' Wet
Depth ..... 7" Outlet ..... ¾" Male NPT Weight ..... ALUM. 22 lbs.
Max. Size Solids ... ⅛" Dia. S.S./HASTELLOY 35 lbs.

Example: *To pump 10 gpm against a discharge pressure of 35 psig requires 40 psig and 5 scfm air consumption. (See dot on chart.)*

Note: For M-2 pumps fitted with Teflon diaphragms reduce water discharge figures by 20%. Suction lift for M-2 pumps with Teflon diaphragms: 10 ft. dry, 25 ft. wet.

Caution: Do not exceed 125 psig air supply pressure.

WILDEN® MODEL M-4®

Height ..... 18" Air Inlet ..... ⅜" NPT Suction Lift ..... 22' Dry
Width ..... 14¼" Inlet ..... 1½" Female NPT 27' Wet
Depth ..... 11¾" Outlet ..... 1¼" Male NPT Weight ..... ALUM. 35 lbs.
Max. Size Solids ... 3/16" Dia. IRON/S.S. 52 lbs.

Example: *To pump 22.5 gpm against a discharge pressure of 45 psig requires 60 psig and 20 scfm air consumption. (See dot on chart.)*

Note: For M-4 pumps fitted with Teflon diaphragms reduce water discharge figures by 20%. Suction lift for M-4 pumps with Teflon diaphragms: 12 ft. dry, 25 ft. wet.

Caution: Do not exceed 125 psig air supply pressure.

WILDEN® MODEL M-8®

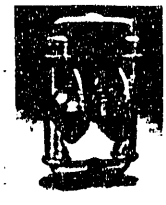
Height ..... 26¼" Air Inlet ..... ½" NPT Suction Lift ..... 20' Dry
Width ..... 15¾" Inlet ..... 2" Male NPT 25' Wet
Depth ..... 13¼" Outlet ..... 2" Male NPT Weight ..... ALUM. 65 lbs.
Max. Size Solids ... ¼" Dia. IRON/S.S. 110 lbs.

Example: *To pump 47 gpm against a discharge pressure of 50 psig requires 60 psig and 40 scfm air consumption. (See dot on chart.)*

Note: For M-8 pumps fitted with Teflon diaphragms reduce water discharge figures by 20%. Suction lift for M-8 pumps with Teflon diaphragms: 12 ft. dry, 18 ft. wet.

Caution: Do not exceed 125 psig air supply pressure.

WILDEN® M-15®



Height ..... 32¾" Air Inlet ..... ½" NPT Weight ..... ALUM. 120 lbs.
Width ..... 20" Inlet ..... 3" Male NPT IRON/S.S. 195 lbs.
Depth ..... 18" Outlet ..... 3" Male NPT Suction Lift ..... 20' Dry
Max. Size Solids ... ⅜" Dia. 25' Wet

Example: *To pump 90 gpm against a discharge pressure of 55 psig requires 70 psig and 80 scfm air consumption. (See dot on chart.)*

Note: For M-15 pumps fitted with Teflon diaphragms reduce water discharge figures by 20%. Suction lift for M-15 pumps with Teflon diaphragms: 12 ft. dry, 18 ft. wet.

Caution: Do not exceed 125 psig air supply pressure.

In addition to those pumps listed, Wilden also offers:

The model M20. This pump offers flows to 320 gpm. Available in cast iron wetted construction only. The pump is manufactured with 4" American Standard Pipe Flange, 125 lb. class. The M20 offers the same ease of maintenance as our standard pump line.

The model M8 High Pressure Pump. This unit is capable of pumping product against 650 ft. of head pressure. Available in stainless steel wetted construction with Saniflex diaphragms only.

Please contact the factory for additional information regarding our new pump models.

WILDEN PUMP & ENGINEERING CO.

22069 Van Buren Street / P.O. Box 845
Colton, California 92324
714 / 422-1700
Telex: 678-452
FAX: 714-783-2432

BA&P 15.9 A Rev. 7/90

AIR OPERATED DOUBLE DIAPHRAGM PUMPS

WILDEN PUMPS®

- ☐ FOOD PROCESSING INDUSTRY
- ☐ WASTE TREATMENT
- ☐ CIRCUITS MANUFACTURING
- ☐ REFINERIES & CHEMICAL PROCESSING
- ☐ SEWAGE SLUDGE
- ☐ PAINT MANUFACTURING PLANTS
- ☐ ADHESIVES & GLUES
- ☐ SHIPS & MARINE
- ☐ CERAMIC PLANTS
- ☐ CARPET & TEXTILE PLANTS
- ☐ CONSTRUCTION & MINING
- ☐ DRY POWDER TRANSFER
- ☐ RUBBER INDUSTRY
- ☐ BREWING PLANTS
- ☐ WELL DRILLING
- ☐ AND MANY MORE . . .

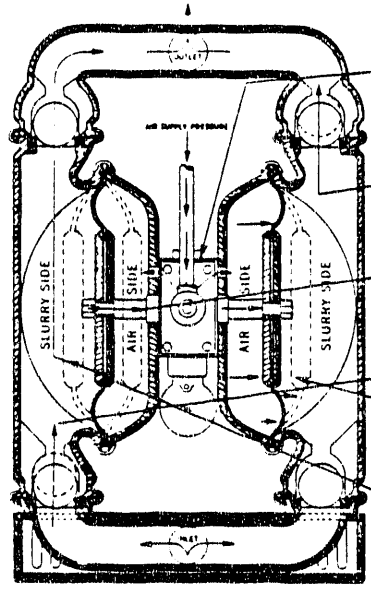
COMPARISON CHART

	WILDEN	Centrifugal	P.D. Gear	P.D. Lobe	P.D. Vane	Self-Priming Trash	Progressive Cavity	Piston/Plunger	Rotary Screw	Vortex	Regenerative Turbine
Dry, self-priming suction up to 20'	●		●	●	●	●		●			◐
Variable speed	●										
Variable pressure (up to 300 PSI)	●										
No mechanical seals	●								●		
Explosion resistant	●	●									
Submersible	●	●								●	●
Completely portable	●					●					
No rotating parts (or ball bearings)	●										
Can run dry without damage	●										
No couplings required	●										
Dead head capability (w/o bypass valve)	●										
No efficiency loss due to wear	●										
No efficiency loss to changing pressure or flow	●										
Complex controls not required	●				●						
Does not generate heat	●										
Handles abrasive fluids	●	●			●					●	●
Handles abrasive, high viscosity fluids	●										
Handles non-abrasive, high viscosity fluids	●		●	●	●		●	●	●		
Handles abrasive, highly corrosive fluids	●	●								●	
Handles non-abrasive, highly corrosive fluids	●	●	●	●	●	●	●	●	●		●
One unit handles many types of materials	●					●		●			
Operating temperatures to over 300° F	●	●	●	●	●	●	●	●	●	●	●
Ideal for shear sensitive products	●		●								

THE WILDEN PUMP
HOW IT WORKS

Compressed air is applied directly to the liquid column separated by elastomer diaphragms. This balanced load removes the mechanical stress from the diaphragms to allow high heads and thousands of hours of diaphragm life.

The pumping volume is controlled by easy inlet air adjustments, from a few gallons per hour to over fourteen thousand gallons per hour with the same unit. A by-pass valve is not required because the pump stops when discharge pressure equals air inlet pressure. The pump can also run dry indefinitely without damage. Our double diaphragm design cuts velocity through the pump to half total discharge velocity. The most abrasive slurries produce little wear effect on pump parts.



Patented, one-moving-part air valve directs air supply pressure to back side of diaphragm.

Slurry is pushed out of liquid chamber through pump outlet.

At the same time opposite diaphragm is pulled in by shaft connected to pressurized diaphragm.

Suction created draws slurry into liquid chamber through pump inlet.

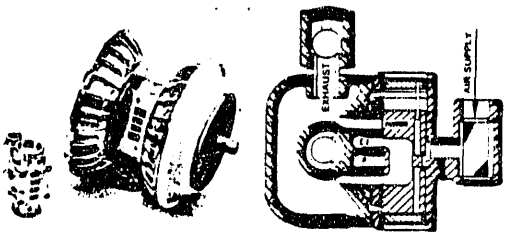
When pressurized diaphragm reaches limit of stroke, air valve shifts air pressure to air side of opposite diaphragm.

Slurry is then pushed out of liquid chamber through pump outlet.

WILDEN'S SUPERSAVER AIR DISTRIBUTION SYSTEM

Every new Wilden pump incorporates a redesigned "state-of-the-art" air distribution system, which provides up to 13 percent greater pumping capacity and reduced air consumption averaging over 10 percent across the entire performance range. This redesigned system focuses on optimizing air flow. Aerodynamically tuned ports and passageways minimize turbulence and drag, reducing internal energy losses, and maximizing energy transfer to the fluid being pumped. Casting techniques, such as die casting and injection molding, allow for the design of streamlined contours and provide smoother skin surfaces, providing a significant reduction of friction of both air and fluid flow, further reducing the amount of pressure required to transfer a given quantity of liquid. Lower pressures mean lower energy consumed. The operating principles and basic structure of the Wilden air valve, which have provided the highest level of reliability for over 30 years, remains unchanged. We have simply made the best a little better by re-engineering components unrelated to the critical shifting functions which make the Wilden valve superior to any other valve system. The ability of the valve to deliver unequaled reliability operating against a stall, or in intermittent service at minimum air supply pressures, remains unchanged.

Pre-1985 Wilden pumps can achieve these energy savings by retrofitting the existing air distribution system with the new design.



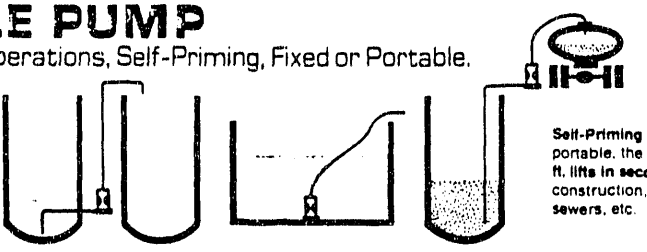
Exclusive Air Valve — the only moving part in the unique Wilden air valve is the coated piston. The Wilden air valve is externally serviceable. Unlike many other air driven pumps, the Wilden pump does not need to be disassembled to service the air valve. Removing four bolts makes the air valve easily available for inspection or service.

USE THIS VERSATILE PUMP

In Permanent Installations, Submerged Operations, Self-Priming, Fixed or Portable.

Permanent Installations — no foundations, no electrical controls required, handles sludges, slurries, acids, explosives, abrasives, 4 clamps remove it from permanent piping.

Submerged Operation — for construction, industrial pumping, handles mud, sand, mill scale, grout, sludges; lightweight and portable.



Self-Priming Installation — fixed or portable, the pump will prime dry to 20 ft. lifts in seconds for use in construction, utilities, mines, sumps, sewers, etc.

MATERIALS AND FINISHES

Materials of construction for wetted parts are: aluminum, class 30 cast iron, 316 stainless steel, Hastelloy C, injection-molded polypropylene, Teflon® PFA, and injection-molded PVDF. Non-wetted materials are: aluminum, polypropylene, with cast iron or 316 stainless steel available as options in some models. Diaphragms, valve balls and seats are available in: Neoprene, polyurethane, Buna N, EPDM, Viton, Hypalon, Saniflex™ and Teflon® (TFE). All materials not available in all models, see your Wilden dealer or consult factory for specific models. All metallic pumps except food models are finished in high quality, hard coat, gloss orange enamel. All metallic pumps can be specified non-painted. Models M-4, M-8 and M-15 in aluminum construction can be ordered with an optional strainer to prevent oversize solids from entering the pump's inlet.

SAMPLE TECHNICAL SPECIFICATION

GENERAL DESCRIPTION: The pump shall be compressed air-operated, double-diaphragm design with ball check valves. Held together with clamp bands for added security, easy maintenance, and quick inspection. Pumping action shall be controlled by an externally serviceable air valve with only one moving part. Pump shall have a _____(size)_____ suction inlet and a _____(size)_____ discharge port. Pump shall be self-priming, capable of high suction lift and able to run dry without damage.

CONSTRUCTION: Wetted parts shall be of _____(material)_____. Elastomers shall be of _____(material)_____ diaphragms, _____(material)_____ valve balls and _____(material)_____ valve seats.

CAPACITY: Pump shall be capable of delivering _____(x)_____ gallons per minute at _____(x)_____ feet of discharge and _____(x)_____ feet of suction lift, using _____(x)_____ PSI and _____(x)_____ SCFM of compressed air. (Refer to performance charts.)

AVAILABILITY

Wilden pumps are sold through a network of qualified, authorized distributors. Wilden's distributors maintain a stock of pumps and replacement parts. Generally customers' requirements can be handled from distributor stock in a matter of days. Factory shipments generally take two to four weeks, depending upon the specific order. Current list prices are published and are available from Wilden's distributors or by request from the factory.

WARRANTY

All pumps manufactured by Wilden Pump and Engineering Company are manufactured to the highest standards of quality and workmanship. Every pump is hydrostatically and functionally tested and guaranteed to operate as designed and meet our published performance curves. Materials and workmanship are guaranteed for one year from start-up or two years from shipment, whichever occurs first. Flow rates were determined by measurement into calibrated tanks and air consumption data was determined by the use of calibrated mass flow meters.

Wilden offers more . . .

More Sizes — Five sizes with flows from 0 to 230 GPM

More Elastomer Materials — Compatibility with any chemical solution.

More Value — Lower prices and operating costs

More Performance — Higher flows

More Pump Materials — Aluminum, cast iron, 316 SS, Hastelloy C, polypropylene, PVDF, Teflon® PFA.

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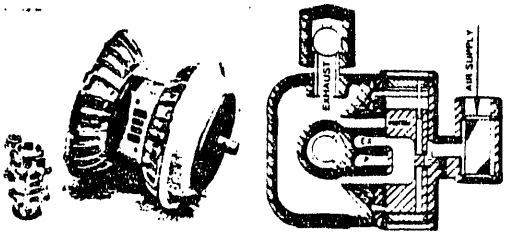

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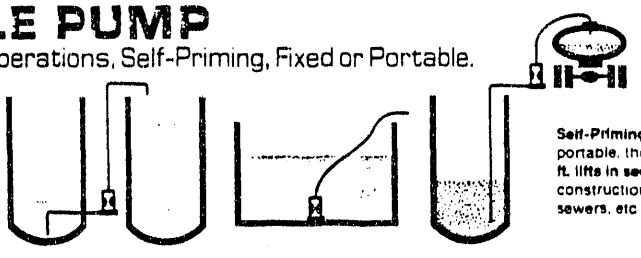

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F A X

****

A P I / R O N A N
LEAK DETECTION SYSTEMS
2300 E. ARTESIA BLVD.
LONG BEACH, CA 90805

PHONE (213) 984-5380 FAX (213) 984-5390

TO: Kelly Galloway COMPANY NAME: E G & G

LOCATION: _____ FAX NUMBER: 208-526-1998

FROM: Matt Thomas DATE: 4-23-92

NUMBER OF PAGES INCLUDING THIS SHEET: _____

##########

SUBJECT: 3 sump / containment syts.

Kelly -

Thank you for your call and I most apologize for not calling you back. Anyhow our X765 Leak Detection System will suite your needs. Please review attached sales info.

The following model # will provide the three liquid sensors, IS Barriers, LED, and Auxiliary Relay or horn options.

X765A3 - (3) LS-3 St. Steel Listed $1735.00

Delivery 2-4 weeks

I will call in tomorrow (4-24-92) and confirm this fax.

Thanks & Best Regards,

Matt

IF YOU DID NOT RECEIVE THE NUMBER OF PAGES STATED ABOVE, OR IF THE COPY IS NOT LEGIBLE, PLEASE CALL THE ABOVE NUMBER.

Series X76S
Leak Detector System

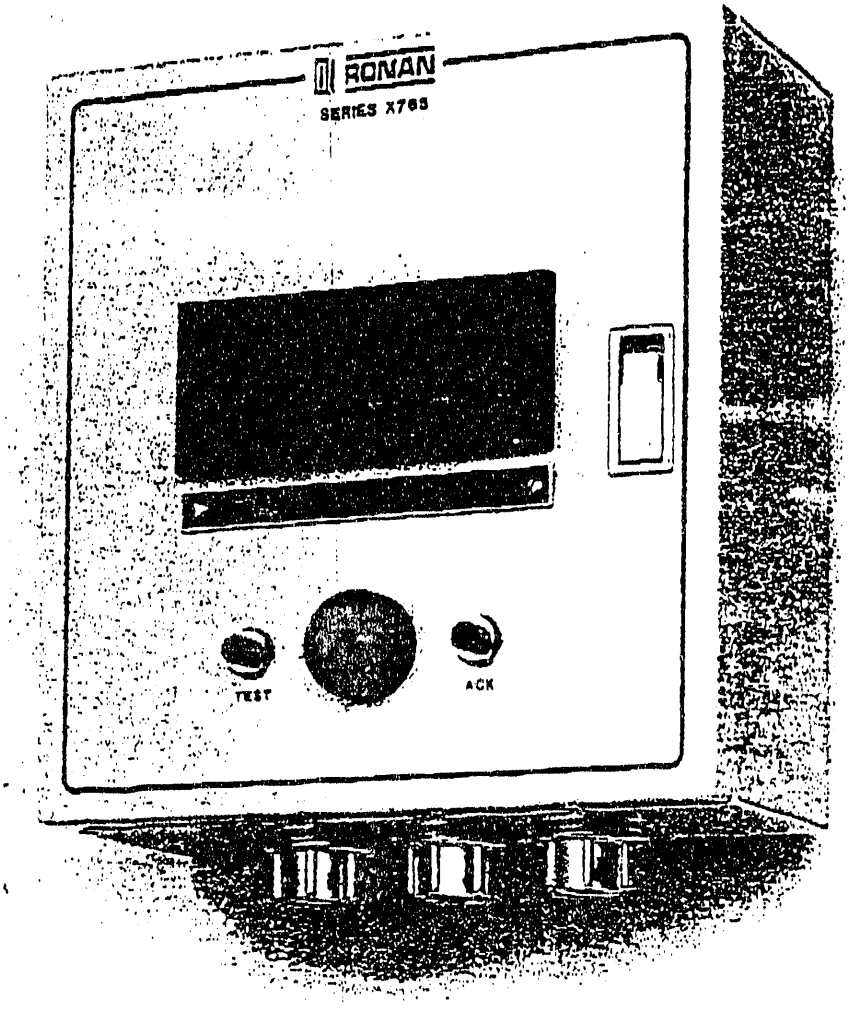
RONAN

Features

- ☐ Up to 4 Input Modules with LED Indicators
- ☐ Audible and Visual Alarms
- ☐ Intrinsically Safe Interface to Sensor
- ☐ Field-Proven Circuit Design
- ☐ NEMA Type 1 Enclosure
- ☐ Rugged Mechanical Design
- ☐ Liquid Level Sensors
  - • High Reliability
  - • UL Listed
  - • Compatible with Hydrocarbons
  - • Maintenance Free
- ☐ Alarm Contact Output per Sensor for Remote Indication or Telemetering
- ☐ Hydrostatic Leak Detector for Double-wall Tanks
- ☐ Positive Pressure Sensor for Pressurized Double-wall Tanks

Factory Mutual System Approved

UL Listed 48RO



The Model X76S Leak Detector System continuously monitors underground storage tank installations for leakage of gasoline, diesel oil, waste oil and other hydrocarbons.

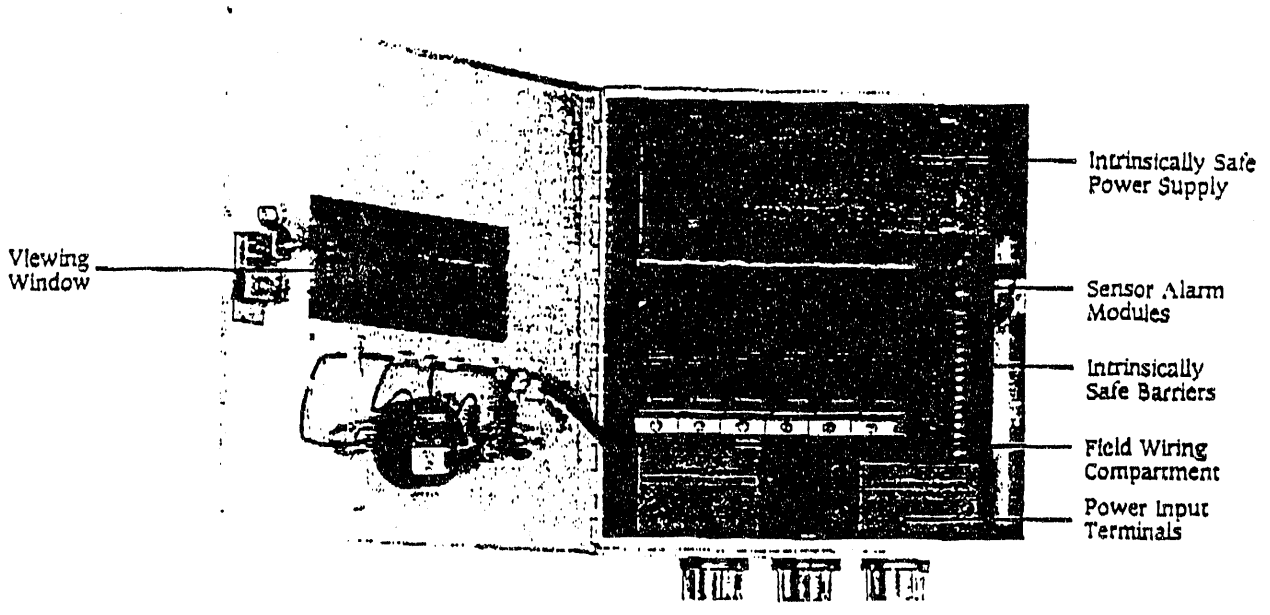
Two types of Liquid Level Sensors are horizontally or vertically positioned in the normally dry annular space of double-walled tanks. Upon accumulation of product due to a leak, the sensor will provide an audible and visual alarm.

Hydrostatic and air pressure sensors can provide monitoring of both the outer or inner shell of a double-wall tank.

The sensor's outputs are continuously supervised by individual alarm modules via FM approved intrinsically safe barriers. This allows installation of the sensors in Class I, Division 1, Groups C, or D areas as defined in the National Electrical Code, without using costly conduits, conduit seals and explosion proof junction boxes.

The X76S provides up to four sensor alarms.

Series X76S Leak Detector System

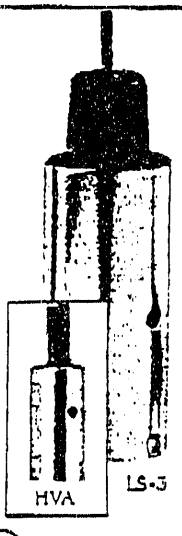


The Sensors

Model LS-3 N.C. & HVA Tank Level Sensors

The Model LS-3 N.C. is most suitable for steel, double-wall tanks. The unit is positioned vertically on the bottom of the tank annulus or at maximum fuel level of a tank to prevent overflow. The all-polysulfone level switch features a single-pole, single-throw contact, actuated by the float of the unit. The contact status is annunciated on the X76S monitor.

The HVA is a miniature liquid sensor for use in restricted vertical riser applications.



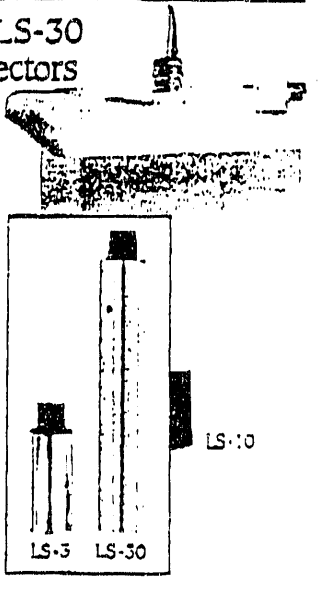
UL Listed 48RO

Models LS-3 N.O. & LS-30 Hydrostatic Leak Detectors

The Models LS-3 N.O. and LS-30 Leak Detectors monitor any U.L. rated hydrostatic double-wall fiberglass tank reservoir.

Due to the possibility of groundwater seeping into a reservoir, the LS-30 is designed to detect liquid level gains as well as losses.

LS-10 and LS-20 Reservoir Assemblies are supplied when a permanent reservoir is not part of the tank package.

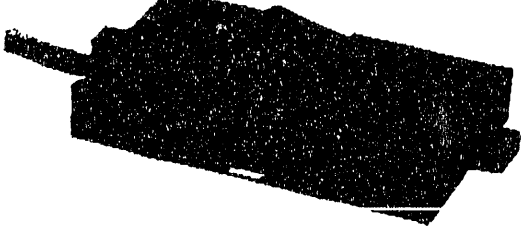


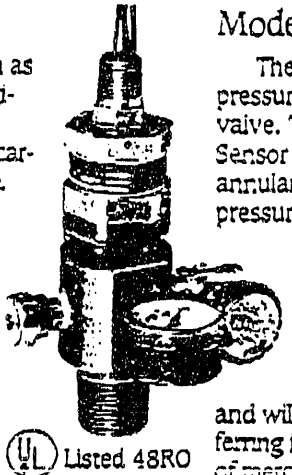
UL Listed 48RO

Model LS-7 Tank Level Sensor

The Model LS-7 Level Switch is designed for horizontal applications where access is difficult, such as a dual-wall fiberglass tank's annulus. The unit is engineered to provide high-reliability point-level sensing. The plastic construction is compatible with all hydrocarbon liquids, providing long, trouble-free performance.

UL Listed 48RO





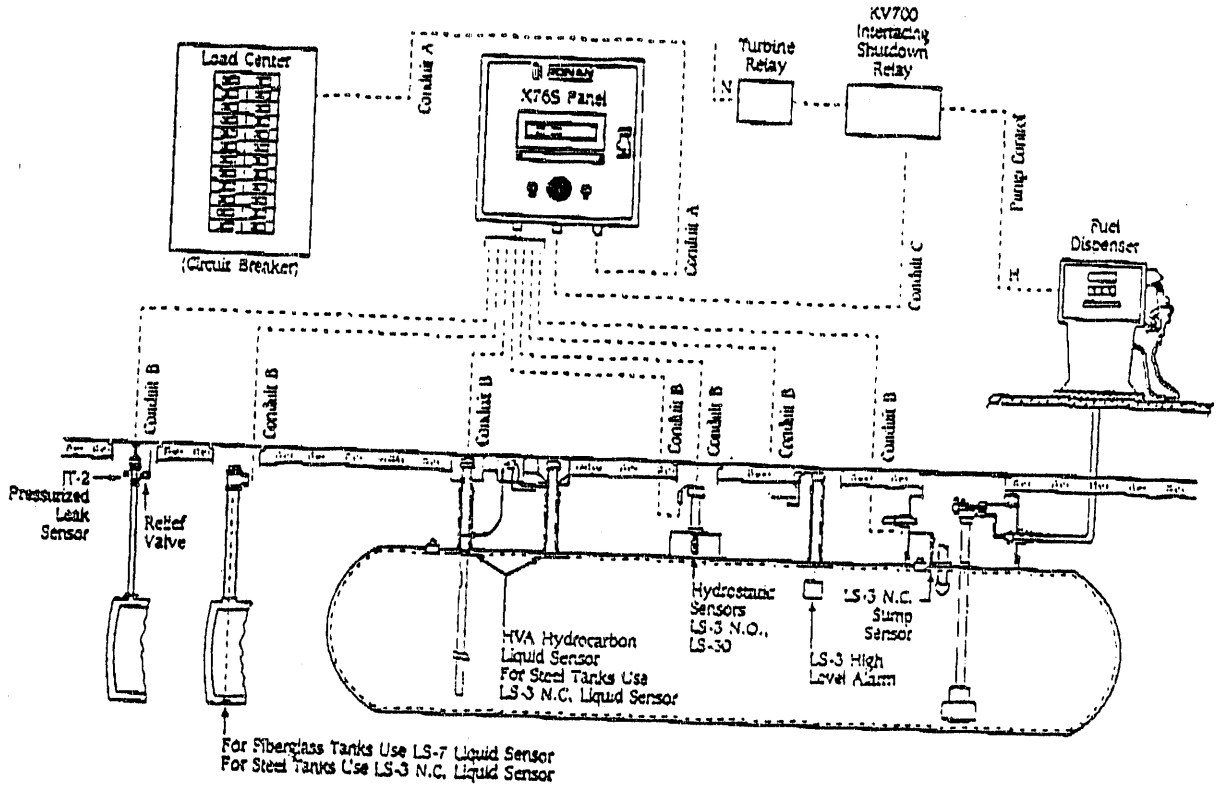
UL Listed 48RO

Model JT-2 Tank Leak Sensor

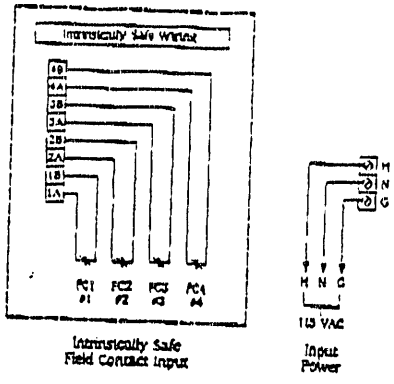
The Model JT-2 assembly consists of a pressure switch, fill valve and safety release valve. The Model JT-2P Positive Pressure Leak Sensor is designed to provide monitoring of the annular cavity of double-wall tanks via air pressure. Any breach of the containment will cause a pressure loss and will be sensed by the pressure switch transfiguring its contact should pressure fall below .5 PSIG.

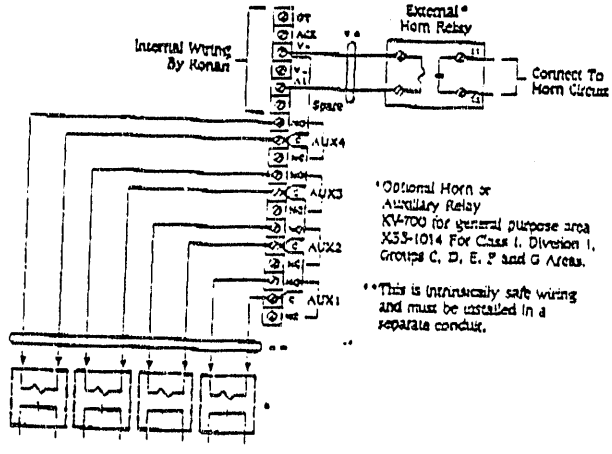
The Model JT-2V Vacuum Leak Sensor monitors for loss of vacuum and will be sensed by the vacuum switch transferring its contact should vacuum fall to .5 inches of mercury.

Typical Installation

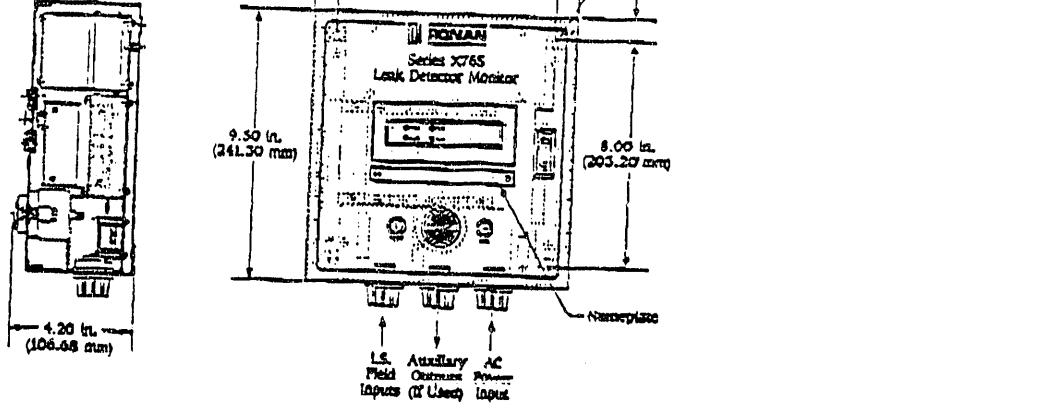


Wiring Information





Mechanical Dimensions



Specifications

System, Model X76S
Power: 115 Vac, 60 Hz
Power Consumption: 100 VA
Operating Temperature: 32° to 165°F (0° to 75°C)
Dimensions: 9×9.5×4.2 in. (22.86×24.13×10.67 cm)
Mounting: General purpose area; wall mount

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Alarm Module
Field Sensor: Dry contact
Field Sensor Voltage: 115 Vac (supplied by X76S)
Number of Inputs: One per module

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Intrinsically Safe Barrier Module X53
Number of Inputs: Two per module
Sensors Voltage: 24 Vdc, current limited
Sensors: Dry contact
Output Interface to Alarm Module: Relay contact; normally open/normally closed; selectable
Power Consumption: 750 mW per input
Supply Voltage: 24 Vdc from I.S. power supply

FM Approved, UL Listed 48RO

Power Supply I.S. (Intrinsically Safe)
Power Input: 115 Vac
Output Voltage: 24 Vdc

FM Approved, UL Listed 48RO

Tank Leak Sensor, Model LS-3 N.C.
Housing: 304 stainless steel
Switch:
Type: SPST N.C.
Rating: 10 VA
Float material: Buna-N
Pressure: 50 PSIG maximum
Leads: 20 AWG

UL Listed 48RO

Tank Leak Sensor, Model LS-7
For steel and fiberglass double-wall tanks.
Housing Material: PVC (Geon 87241)
Liquid SpG: .70 minimum
Switch:
Type: SPST N.C.
Rating: 10 VA
Leads: 20 AWG

UL Listed 48RO

Hydrostatic Tank Leak Detectors, Models LS-10 or LS-20
Reservoir:
Volume:
LS-10, two gallons (7.47 liters)
LS-20, four gallons (15.14 liters)
Material: Polyethylene plastic
Switches: Model LS-3 N.O. and LS-30
Type: LS-3 N.O., SPST; LS-30, DPDT
Rating: 10 VA
Float material: Buna-N
Pressure: 50 PSIG maximum
Leads: 20 AWG

UL Listed 48RO

HVA Mini Liquid Vertical Riser Sensor
Housing: Stainless steel
Contacts: Gold plated
Float: Gold plated aluminum
Type: Single pole, normally open
Leads: 20 AWG

UL Listed 48RO

Tank Leak Sensor, Model JT-2
Housing: Stainless steel, explosion proof, hermetically sealed, NEMA Types 7 and 9
Classification:
Class 1: Groups A, B, C and D
Class 2: Groups E, F and G
Switch:
Type: SPDT N.O. (shelf condition)
Rating: 10 VA
Electrical Connection: ½ in.–14 NPT with PVC-insulated 18 AWG leads
Pressure:
Setpoint: JT-2 Positive Pressure Leak Sensor, .5 PSIG, JT-2V Vacuum Leak Sensor, .5 inches of mercury
Connection: ¼ in.–18 NPT
Adjustment: ⅛ in. Allen wrench through port
Temperature Range: –40° to 180°F (–40° to 82°C)

UL Listed 48RO; CSA Approved 34146

Ordering Information

The Ronan Model X76S Leak Detector Monitor System can be configured to meet the different local and state codes for underground storage by proper selection of sensors and monitor modules. For example, a particular local code and/or type of facility may require leak detection of a tank annulus. The monitor system would consist of the following items:

Model X76S-( )-(_____)

- Sensor Type
  - LS-3(*) Vertical Liquid Level
  - LS-7 Horizontal Liquid Level
  - LS-10 Hydrostatic Reservoir with LS-3
  - LS-20 Hydrostatic Reservoir with LS-3
  - LS-30 Dual Liquid Level
  - HVA Mini Liquid for Vertical Riser
  - JT-2P Positive Pressure Leak
  - JT-2V Vacuum Leak
  - * N.O.–Normally Open, N.C.–Normally Closed
  - Note: Use additional listing if more than one type of sensor is used, e.g.: (2LS-3)-(1LS-10)
- Sensor Quantity
- No. of Alarm Inputs (1 thru 4) max 4

Warranty: Ronan warrants equipment of its own manufacture to be free from defects in material and workmanship under normal conditions of use and service, and will repair or replace any component found to be defective, on its return, transportation charges prepaid, within one year of its original purchase. This warranty carries no liability, either expressed or implied, beyond our obligation to replace the unit which carries the warranty.

RONAN

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X76S / 190

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APPENDIX D.

Sentry Polymers, Inc. Secondary Containment/
Leak Detection Specifications.

Sentry POLYMERS, INC.

SPECIFICATION
FOR LINING CONCRETE PITS
FOR THE PURPOSE OF LEAK DETECTION

1.0 Scope:

The intent of this specification is to provide a false floor and wall to accommodate leak detection in a concrete pit.

The Semstone reinforced lining on the floor to be approximately 1 3/4" above the finished surface of the concrete floor. This is to be accomplished by installing 1 1/2" thick fiberglass grating over the floor with a sheet of 1/8" FRP fiberglass factory molded to one side facing up. The FRP grating and sheet to be secured in place using concrete anchors with washers installed on 36" centers.

The false walls to be accomplished using 1/8" thick fiberglass sheet fastened to the walls using concrete anchors with washers. The concrete anchors are to be installed on 24" centers.

All fiberglass sheet to be coated with a 125 mil laminate of Semstone 870 and chopped strand mat with a nexus 100-10 surfacing veil.

2.0 Materials

2.1 Coating Material: Semstone 870 Vinyl Ester manufactured by Sentry Polymers, Freeport, Texas. No substitutes will be accepted.

2.2 Primer: Semstone 8084 Primer manufactured by Sentry Polymers, Freeport, Texas. No substitutes will be accepted.

2.3 Reinforcement: Fiberglass chopped strand mat, multidirectional, .75 or 1.5 oz. per sq.ft.

2.4 Surfacing Veil: Nexus 100-10 polyester surfacing veil.

2.5 Floor Covering: Fiberglass covered grating, 1 1/2" thick X 1 1/2" square mesh with .125" fiberglass sheet molded to one side.

2.6 Wall covering: 1/8" thick pultruded fiberglass sheet.

P.O. BOX 2076-A / FREEPORT, TEXAS 77541 / (409)233-0312

2.7 Concrete anchors: 3/8" diameter Stainless Steel with washers manufactured by Hilti Corp., (or equal).

2.7 Detection pipe: FRP, with pipe cap, diameter to be at owners discretion, to be installed at location designated by owner.

NOTE: Pipe cap (no threads) to fit snug with attachment to detector pipe to prevent loss. Detector pipe to be coated with Semstone 870 and reinforced with fiberglass mat prior to installation.

3.0 Drawings

3.1 Supplied by owner:

3.1.1 _____, _____, _____, _____.

4.0 Quality Control

4.1 Owner/Design engineer to decide who will be responsible for quality control. Please mark an "X" on the appropriate line to indicate choice.

___ Owners Representative
___ General Contractors Representative
___ Application Contractor
___ Third Party; Specify: _____

4.2 Visually inspect covered grating installation on floors and fiberglass sheet on walls for proper anchoring into concrete.

4.3 Interfacing panel edges are not to exceed 1/4" at any interface including concrete walls.

4.4 Visually inspect surface preparation of fiberglass sheet to insure that all glaze is removed and that the profile is similar to rough sandpaper.

4.5 Visually inspect that all corners have received a 1" radius with Semstone 8084 putty, prior to proceeding with application of Semstone 870 laminate .

4.6 Visually inspect completed lined pit. Reasons for rejection are as follows:

A. Pinholes in lining.
B. Uncured material.
C. Foreign inclusions in cured lining.
D. Inadequate thickness.
E. Use of materials not authorized in this specification.
F. Exposed reinforcement / unwet mat.
G. Wrinkles or hollow spots in lining.
H. Unauthorized variance from this specification

5.0 False floor and wall installation

NOTE: In order to reduce field installation time it is recommended to take accurate field dimensions and pre-fabricate all floor and wall panels in a shop environment. This will reduce field installation time to a minimum.

5.1 The floor of the concrete pit shall be covered using 1 1/2" thick fiberglass grating with a 1\8" thick, flat, fiberglass panel molded to one side. The paneled side should face up. Anchor panels in place using 3\8" Hilti Anchors. Set anchors at 24" centers.

Note: Locate detector pipe locations and pre-cut holes in covered grating prior to installation.

5.2 Set 1/8" thick fiberglass panels against the walls to within 3" from the top of the pit and anchor with 3/8" Hilti Anchors. Set anchors on 24" centers.

6.0 Semstone 870 Reinforced liner Installation

6.1 Abrasive blast fiberglass panels to remove any surface contamination, mold releases and/or surface glaze to achieve a 1-1/2 - 2 mil anchor profile.

6.2 Remove all blasting dust and debris by sweeping and/or vacuuming.

6.3 Apply Semstone 8084 primer to all corners, from the corner to 2" out from the corner. Allow to set dry to touch.

6.4 Apply Semstone 8084 putty to all corners to form a 1" radius.

6.5 Apply a basecoat of Semstone 870 and immediately embed a layer 1.5 oz. per sq.ft. fiberglass chopped strand mat into the basecoat. Apply a coat of Semstone 870 over the mat and work the surface with a serrated roller to remove entrapped air. Repeat this sequence until (four layers of .75 oz. per sq.ft. chopped strand mat) or (two layers of 1.5 oz. per sq.ft. chopped strand mat) are completely saturated with Semstone 870 and all entrapped air is removed. Apply one layer of Nexus 100-10 surfacing veil, saturate and remove all entrapped air. Allow to cure.

If the panels have been pre-fabricated, only the seams and anchor bolt heads need to have a laminate applied in the field. The seams should be 8" wide with the nexus overlapped a minimum of 1". The bolt heads should be encapsulated with a 6" diameter laminate.

NOTE: Refer to specific material data sheets for mixing and application of Semstone 8084, and Semstone 870.

7.0 FRP leak Detector Pipe Installation

7.1 The FRP detector pipe is to extend a minimum distance from the top of the pit in order to facilitate access.

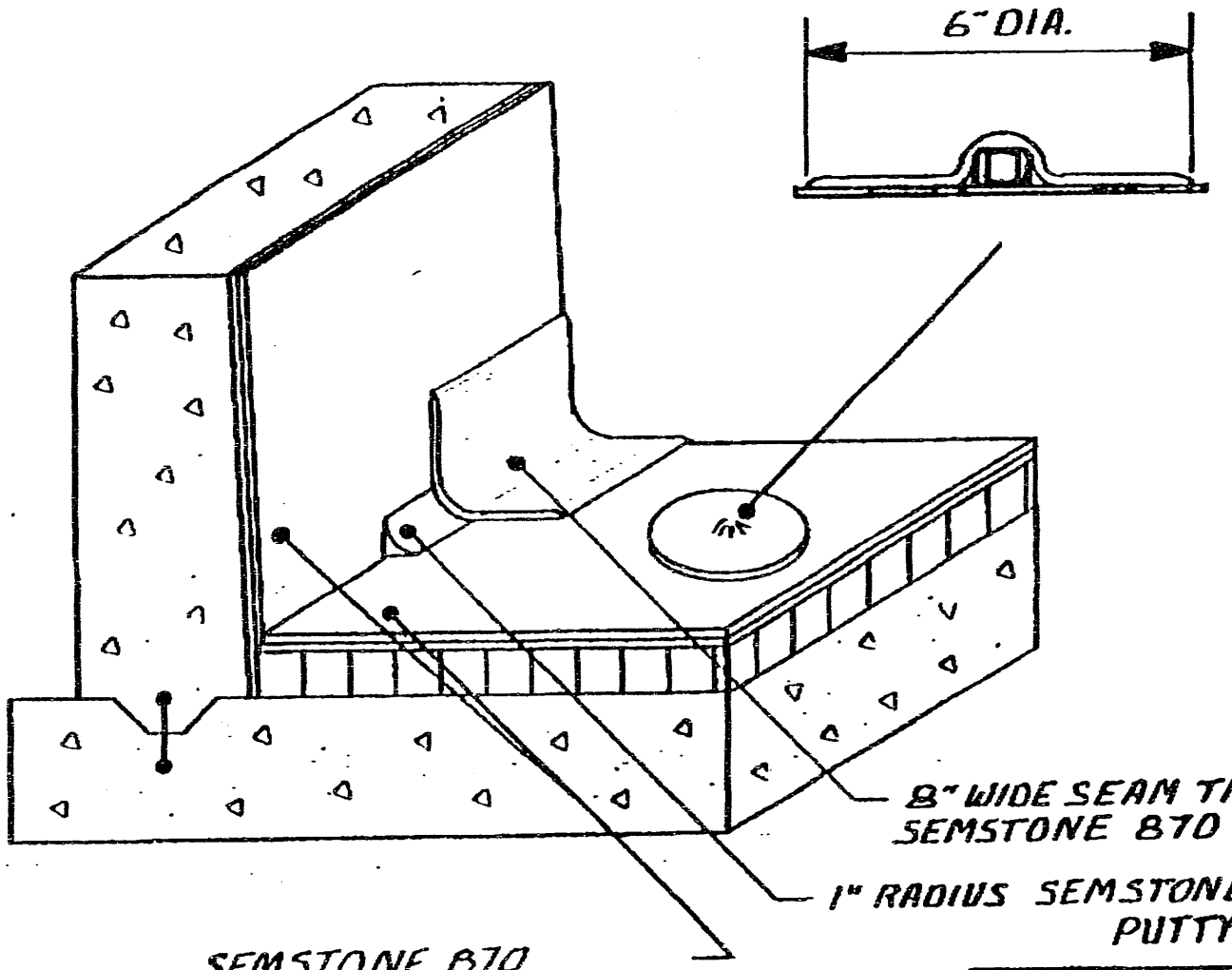
7.2 Sand or abrasive blast approximately 8" from the end of the pipe to receive tie-in the bottom pit. Sand or abrasive blast approximately 8" around the perimeter of hole in the liner for the detector pipe.

7.3 Install FRP detector pipe at location designated by owner FRP detector pipe location should allow adequate space for proper re-establishment of Semstone 870 liner.

7.4 Contractor is responsible for proper support of detector pipe.

7.5 Once the detector pipe is fitted and supported properly, apply a 1" radius of Semstone 8084 putty around pipe/floor interface. Allow to cure.

7.6 Apply Semstone 870 and fiberglass chopped strand mat approximately 6" out on to the horizontal and 6" up the vertical surface to a finished thickness of 250 mils using a serrated roller to remove entrapped air. Refer to Para. 6.5



CONCRETE PIT LINING
LEAK DETECTION

SENTRY POLYMERS 5-92

APPENDIX E.

Calculations for Material Costs.

Sump VES-FT-548: Secondary containment Liner System

I. General Information

A. Liner Dimensions: 5.5 ft x 5.5 ft x 5.833 ft
(length x width x depth)

B. Surface Area Covered: 4 sides(5.5 ft x 5.833 ft) = 128.3 ft^2
1 floor(5.5 ft x 5.5 ft) = + 30.3 ft^2
158.6 ft^2

C. Liner Material and Paint Sealant Costs:

Walls (870 laminate, panels, fiberglass, primer) = \$8.53/ft^2
Floor (grating, panels, 870 laminate) = \$20.80/ft^2
Leak Detection Pipe (1 ft diameter) = \$70/linear ft
Paint Sealant for Sump Concrete (870 coating and primer) = \$0.96/ft^2

II. Sump VES-FT-548 Liner Cost Calculations

A. Wall Lining: (128 ft^2)(\$8.53/ft^2) = \$1,092

B. Floor Lining: (30 ft^2)(\$20.80/ft^2) = \$624

C. Leak Detection Pipe plus Lining

Pipe surface area $2\pi rh = 2\pi(.5 \text{ ft})(7.5 \text{ ft}) = 23.6 \text{ ft}^2$
(7.5 ft)(\$70/ft) = \$525 pipe
(23.6 ft^2)(\$8.53/ft^2) = \$201 pipe laminate

\$525 pipe + \$201 lining = \$726

D. Total Liner System Material Cost Estimation

\$1,092 walls + \$624 floor + \$726 pipe and lining = \$2,440

III. Paint Sealant for Sump Concrete (paint coating plus primer)

(160 ft^2)(\$0.96/ft^2) = \$153.60 ≈ \$160

Sump VES-FT-549: Secondary containment Liner System

I. General Information

A. Liner Dimensions: 6 ft x 6 ft x 11 ft
(length x width x depth)

B. Surface Area Covered: 4 sides(6 ft x 11 ft) = 264 ft^2
1 floor(6 ft x 6 ft) =+ 36 ft^2
300 ft^2

C. Liner Material and Paint Sealant Costs:

Walls (870 laminate, panels, fiberglass, primer) = \$8.53/ft^2
Floor (grating, panels, 870 laminate) = \$20.80/ft^2
Leak Detection Pipe (1 ft diameter) = \$70/linear ft
Paint Sealant for Sump Concrete (870 coating and primer) = \$0.96/ft^2

II. Sump VES-FT-549 Liner Cost Calculations

A. Wall Lining: (264 ft^2)(\$8.53/ft^2) = \$2,252

B. Floor Lining: (36 ft^2)(\$20.80/ft^2) = \$749

C. Leak Detection Pipe plus Lining

Pipe surface area $2\pi rh = 2\pi(.5 \text{ ft})(12.5 \text{ ft}) = 39.3 \text{ ft}^2$
(12.5 ft)(\$70/ft) = \$875 pipe
(39.3 ft^2)(\$8.53/ft^2) = \$335 pipe laminate

\$875 pipe + \$335 lining = \$1,210

D. Total Liner System Material Cost Estimation

\$2,252 walls + \$749 floor + \$1,210 pipe and lining = \$4,211

III. Paint Sealant for Sump Concrete (paint coating plus primer)

(300 ft^2)(\$0.96/ft^2) = \$288

Sump VES-FT-534: Secondary containment Liner System

I. General Information

A. Liner Dimensions: 8.5 ft x 4 ft x 6 ft
(length x width x depth)

B. Surface Area Covered:

2 sides(4 ft x 6 ft) =	48 ft^2
2 sides(8.5 ft x 6 ft) =	102 ft^2
1 floor(4 ft x 8.5 ft) =	+ 34 ft^2
	184 ft^2

C. Liner Material and Paint Sealant Costs:

Walls (870 laminate, panels, fiberglass, primer) = \$8.53/ft^2
Floor (grating, panels, 870 laminate) = \$20.80/ft^2
Leak Detection Pipe (1 ft diameter) = \$70/linear ft
Paint Sealant for Sump Concrete (870 coating and primer) = \$0.96/ft^2

II. Sump VES-FT-534 Liner Cost Calculations

A. Wall Lining: (150 ft^2)(\$8.53/ft^2) = \$1,280

B. Floor Lining: (34 ft^2)(\$20.80/ft^2) = \$707

C. Leak Detection Pipe plus Lining

Pipe surface area $2\pi rh = 2\pi(.5 \text{ ft})(7 \text{ ft}) = 22 \text{ ft}^2$
(7 ft)(\$70/ft) = \$490 pipe
(22 ft^2)(\$8.53/ft^2) = \$188 pipe laminate

\$490 pipe + \$188 lining = \$678

D. Total Liner System Material Cost Estimation

\$1,280 walls + \$707 floor + \$678 pipe and lining = \$2,665

III. Paint Sealant for Sump Concrete (paint coating plus primer)

(184 ft^2)(\$0.96/ft^2) = \$177 ≈ \$180

END

DATE
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