ARCADIS
Infrastructure, environment, facilities

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CONSTRUCTION

Mr. William Kutash
Florida Department of Environmental Protection
Waste Management Division
13051 N. Telecom Parkway
Temple Terrace, FL 33637-0926

Subject:
Corrective Action Plan for Interim Groundwater Treatment System
Former American Beryllium Company Site
OGC #04-1328
Tallevast, Manatee County, Florida

Date:
September 19, 2008

Contact:
James M. Bedessem, P.E.

Phone:
813.903.3125

Email:
jim.bedessem@arcadis-us.com

Our ref:
B0038055

Florida License Numbers

Engineering
EB00007917

Geology
GB310

Landscape Architecture
LC26000269

Surveying
LB7062

Dear Mr. Kutash:

This plan presents proposed modifications to the groundwater extraction and treatment system being operated under an Interim Remedial Action Plan (IRAP) at the former American Beryllium Company Site in Tallevast, Florida. Lockheed Martin Corporation (Lockheed Martin) submitted the final IRAP in February 2006. These modifications are intended to improve the reliability of the system in response to the on-site release that occurred on August 3, 2008. These modifications are focused on the in-line aeration system that is part of the iron removal system, the influent tank/containment dike, and the procedures used in operating the system. The proposed modifications associated with each of these components are detailed below.

In-Line Aeration System Modifications

The previous in-line aeration system used a submersible pump to recirculate water from the influent tank through an in-line stainless steel aerator and back into the influent tank using a combination of flexible hose and polyvinyl chloride (PVC) pipe. The water was recirculated at approximately 15 gallons per minute (gpm) and an aeration rate of 1 to 4 liters per minute. The proposed modifications maintain this functional performance, but use more robust equipment and piping to improve reliability and safety and minimize the potential for future releases. Specific features of the proposed modification include:

- Use of triple redundant level switches/alarms for monitoring the influent tank level and containment dike level and shutting down the entire system in the event of a high level in either location.

- Wiring or programming these level control switches and other critical controls to fail on loss of continuity (fail open) so that system will shut down on a loss of signal from any of the control switches.

- Implementation of a redundant interlock system so that the system will shut down even if the existing programmable logic controller (PLC) system fails.

- Continuous staffing and operation of the system 24 hours per day, 7 days per week using qualified personnel until the system can be demonstrated to be operating as intended.

- Implementation of a documented, positive verification program to ensure that the as-built system is constructed and operated as designed and described in this submittal.

- Relocation of equipment and valves to a secure, controlled area inside the treatment building rather than at the influent tank inside the containment dike.

- Use of 316L Schedule 40 welded stainless steel for the aeration recirculation piping. This piping has a pressure rating in excess of 2000 pounds per square inch (psi) and is more resistant to damage from external forces than the PVC or the hose that was previously used.

- Dual containment of the piping between building and the containment dike using clear PVC pipe for observation of leaks.

- Use of lockable valves.

- Installation of two aeration spools installed in parallel so that one can be removed for cleaning while the system remains operable.

- Use of a centrifugal pump capable of producing a recirculation flow rate of 15 gpm at an estimated 101 feet of total dynamic head (TDH). The pump shutoff head is approximately 140 feet TDH or 60 psi.

- Routine testing of critical alarms and interlocks.

These modifications are shown in the drawing package provided in Attachment 1. Headloss calculations for the piping system are provided in Attachment 2. Equipment catalog sheets are provided in Attachment 3.

Influent Tank/Containment Dike Modifications

The proposed modifications to the influent tank and containment dike include the following actions:

- Installation of structural reinforcement of the containment dike,
- Installation of multiple high-level alarms in both the influent tank and containment dike, and
- Replacement of the existing dual-wall schedule 80 PVC process piping between the treatment building and the influent tank/containment dike with 316L Schedule 40 welded stainless steel installed inside clear PVC containment pipe for observation of leaks.

The containment dike yielded, but did not fail during the previous release. To reduce the amount of yield in the sidewalls of the containment in the event of a loaded condition in the future, structural reinforcement will be added to the exterior walls of the containment. Under a loaded condition, the new structural reinforcement will limit the deflection in the 41-foot long sidewalls to less than 0.5 inches. The proposed structural reinforcement is detailed on Sheets S-1 and S-2 in the drawing package provided in Attachment 1.

Multiple high-level alarms will also now be used in both the influent tank and containment dike with the intent of providing triple redundancy of these critical controls. The influent tank will include an ultrasonic level transmitter that will be programmed with multiple actuation levels that include:

1. Low Level Alarm – shuts down the extraction and treatment system
2. Low Level – stops the influent pump to the treatment system and the aeration recirculation pump.

3. Start Level 1 – starts the aeration recirculation pump. This set point is intended to ensure that the influent tank contains oxygenated water and the iron remains precipitated so that the iron removal system functions properly when the treatment system influent pump turns on.

4. Start Level 2 – starts the treatment system influent pump.

5. High Level Alarm – shuts down the extraction and treatment system, including the aeration recirculation system.

To provide redundant backup to this ultrasonic level transmitter, two additional high level switches and one low level switch will be installed in the influent tank. The switch type, alarm condition, and action for each are shown below.

Switch Type	Alarm Condition	Action on Alarm
Float Switch	Low-Low Level Alarm	Shuts down the extraction and treatment system, including the aeration recirculation system.
Float Switch	High-High Level Alarm	Shuts down the extraction and treatment system, including the aeration recirculation system.
Vibrating Switch	High-High-High Level Alarm	Shuts down the extraction and treatment system, including the aeration recirculation system.

A similar triple redundant switch and alarm setup will be used within the containment dike. The switch type, alarm condition, and action for each are shown below.

Switch Type	Alarm Condition	Action on Alarm
Vibrating Switch	High-Level Alarm	Shuts down the extraction and treatment system, including the aeration recirculation system.

Float Switch	High-High Level Alarm	Shuts down the extraction and treatment system, including the aeration recirculation system.
Conductivity Switch	High-High-High Level Alarm	Shuts down the extraction and treatment system, including the aeration recirculation system.

Each of these switches is shown on Drawing M-4 and the alarm conditions are described on Drawing M-6 provided in Attachment 1.

To provide additional factors of safety, each of the control switches will be electrically wired or programmed to fail on loss of continuity (fail open) so that system will shut down on a loss of signal from the switch. Furthermore, the redundant level alarms for each location will be wired/programmed to shut down the system through an independent relay system that does not rely on the existing PLC system. Therefore, in the event of a failure of the existing PLC, the system will still shutdown.

Operational Procedures

Concurrent with the design of the modifications described above, the standard operating procedures (SOPs) included in the Operation and Maintenance Manual (OMM) for the system have been reviewed, modified, and supplemented with additional procedures designed to reduce the potential for releases to occur in the future. Two new draft SOPs associated with the modifications specifically described in this work plan are as follows:

SOP 020 – Critical Alarm Testing

SOP 021 – Aerator Cleaning

These SOPs are provided as Attachment 4. A complete, updated OMM will also be provided to the FDEP prior to system restart.

Additionally, the contingency plan in the OMM has also been reviewed and updated. A draft of the updated contingency plan is provided as Attachment 5.

Schedule for Implementation

Procurement of equipment is occurring concurrently with FDEP review of this work plan. LMC is prepared to initiate construction immediately following FDEP approval.

If you have any questions or need additional information regarding the proposed modifications, please contact me directly at 813.903.3125, or jim.bedessem@arcadis-us.com.

Sincerely,

ARCADIS U.S., Inc.

J. M. Bed
09/19/08

James M. Bedessem, P.E.
Associate Vice President
Florida P.E. License No. 55694

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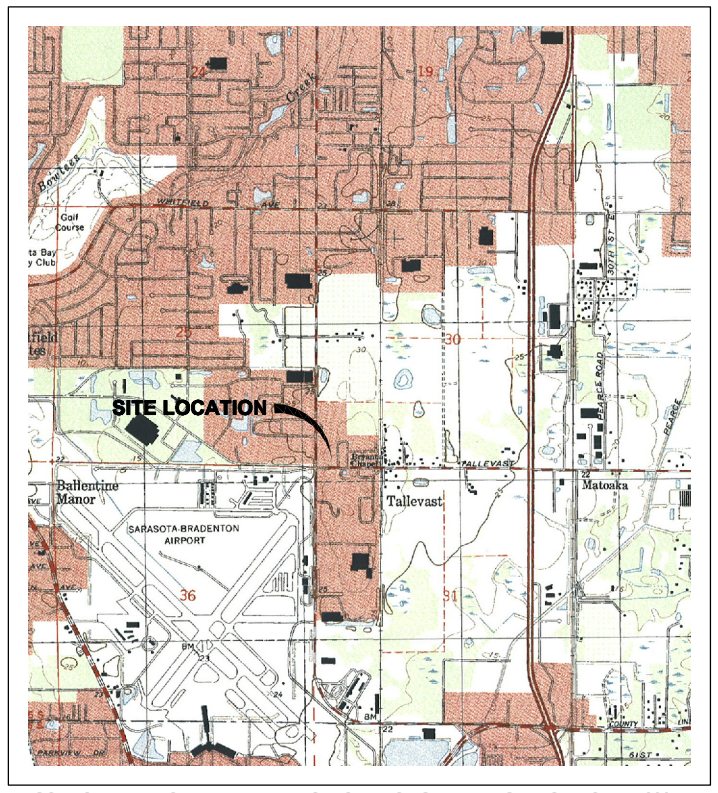
Attachment 1

Design Drawings

CONSTRUCTION DRAWINGS
AERATION SYSTEM REDESIGN

FORMER AMERICAN BERYLLIUM COMPANY

1600 TELLEVAST ROAD
SARASOTA, FLORIDA



SOURCE: MAPTECH-TERRAIN NAVIGATOR PRO - ST. PETERSBURG, FLORIDA 2001.

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0 4000'

HORIZONTAL SCALE

SEPTEMBER 2008

INDEX OF DRAWINGS

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No.	Date	Revisions	By	Chd
2	9/19/08	ISSUE TO FLORIDA DEP	MS	JB
1	9/10/08	AERATION SYSTEM REDESIGN	MS	JB
0	9/4/08	PRELIMINARY CONCEPT REVIEW	JR	JB

Professional Engineer's Name: JAMES MICHAEL BEDESSEM
Professional Engineer's No.: 55694
State: FL | Date Signed: | Project Mgr.: DS
Designed by: JB | Drawn by: MS | Checked by: DS

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FLORIDA CERTIFICATE OF AUTHORIZATION NUMBER 7917

FORMER AMERICAN BERYLLIUM COMPANY SITE • TALLEVAST, FLORIDA
CONSTRUCTION DRAWINGS

TITLE, LOCATION, INDEX OF DRAWINGS

GENERAL

ARCADIS Project No.
B0038055.0002.00010
Date
SEPTEMBER 2008
ARCADIS
3350 BUSCHWOOD PARK DR.
SUITE 100
TAMPA, FLORIDA 33618
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COVER SHEET

Project Overview

The information and drawings in this design package are for the construction of a new aeration system within the existing groundwater extraction and treatment system located at the Former American Beryllium Company (FABC) Site at the following address:

Former American Beryllium Company
1600 Tallevast Road
Sarasota, Florida 34243

The existing system was designed to extract groundwater that has been impacted with volatile organic compounds (VOCs), treat the water to reduce the concentrations of VOCs, and then discharge the treated water to the City of Sarasota sanitary sewer system. The system includes ten groundwater extraction wells (RW-1 through RW-10) and an interim groundwater treatment system that was installed on the FABC property. The maximum flow rate from the entire recovery well system is approximately 75 gpm. The groundwater recovery and treatment system is operated with flexibility so that all of the recovery wells may not be pumping at the same time or at their maximum designed flow rate.

Description of Treatment Process

Recovered groundwater is pumped into an influent equalization tank, then treated by an aeration system followed by filtration. The groundwater is then further treated using an Advanced Oxidation Process (AOP) and granular activated carbon (GAC) adsorption. Following treatment, the water is discharged to the sanitary sewer. A more detailed description of treatment process is provided below.

Flow Equalization

Groundwater pumped from the groundwater recovery system is initially discharged into a 20,000 gallon tank. The purpose of this tank is flow equalization, mixing of groundwater from the multiple recovery wells, and mixing of recovered groundwater with water saturated with oxgyen for iron removal purposes. The tank has a passive vent used to regulate pressure as the tank is filled and drained. This air venting from this tank is treated using vapor-phase GAC.

Proposed Changes to Aeration System

Groundwater is circulated from the influent equalization tank through an aeration system to aid in removal of iron from the water. After groundwater passes through the aeration system, it is saturated with oxygen. The oxygen saturated water is returned to the influent equalization tank for further mixing with incoming groundwater. The existing aeration system will be removed from its existing location within the containment dike and replaced inside the adjacent treatment system building. The proposed aeration system will include of a new centrifugal pump, with double mechanical seals and associated seal flushing system; two inline aerators; an air compressor and associated piping, instrumentation, and appurtenances.

Pre-AOP Filtration Systems

After the groundwater is aerated, the water is pumped through a series of bag filters to facilitate the removal of oxidized iron. The water is then pumped through an additional series of cartridge filters for sediment removal prior to treatment through the AOP process. The filters will remove particulates and protect the subsequent AOP system from scaling and clogging. As the bag and cartridge filters become clogged, they are manually changed out by the system operator.

Advanced Oxidation Processes (AOPs)

The AOP technology is the primary treatment method to reduce concentrations of VOCs in the recovered groundwater. The unit was furnished by, Purifics ES, Inc. (Purifics). The Purifics' system is installed on its own pallet and is an independently controlled treatment system. The technology uses a patented closed-loop titanium dioxide (TiO2) slurry-based photocatalytic oxidation process that is referred to as the Photo Cat system. The Photo Cat system uses air and ultraviolet light, in the presence of a TiO2 catalyst, to generate hydroxyl radicals that attack the bonds in the organic molecules, progressively oxidizing these compounds into benign end-products of carbon dioxide (CO2) and water (H20), and salts.

Granular Activated Carbon Polishing

A series of three GAC vessels provide an additional level of treatment for the chlorinated VOCs including chlorinated ethanes and ethenes in the event of an upset condition in the AOP process. Thus, the GAC is intended to provide a factor or safety against unintended discharges of chlorinated organics and not primary treatment. Two GAC vessels operate at one time, while the other remains in standby mode. As the useful life of the operating GAC vessel is reached the vessel is taken out of service and replaced with the standby vessel.

Discharge

Following treatment, the groundwater is discharged to the City of Sarasota Publically Owned Treatment Works (POTW) through an on-site connection to the sanitary sewer in accordance with an Industrial Wastewater Treatment Permit.

The following specifications apply to the proposed changes to the aeration system component of the existing Groundwater Treatment System:

Site Health and Safety

1. CONTRACTOR must comply with all applicable local, state, and federal health and safety codes at all times. All CONTRACTOR and their subcontractor personnel shall be 40-hour OSHA HAZWOPER trained and current with all applicable refresher training.
2. The contaminants of concern include VOCs and metals that have been detected in the Site's soil and groundwater. Additional information regarding the types and concentrations of contaminants at the Site will be provided upon request.
3. It is CONTRACTOR's responsibility for educating its supervisors, employees, and subcontractors of all health and safety requirements. CONTRACTOR is responsible for worker safety and maintenance of traffic during construction. CONTRACTOR shall maintain a Health and Softey Plan on Site during construction.
4. At a minimum, all onsite CONTRACTOR personnel shall be in Level D at all times (hard hat, steel toes, and safety glasses with hard side shields).
5. NO SMOKING will be permitted at any time on the facility property.

Pipe and Valve Materials

1. Pipe materials include stainless steel and polyvinyl chloride (PVC). Piping materials are identified on the Piping and Instrumentation Diagram. Additional specifications are identified below.
2. Stainless Steel Pipe shall be Type 316L SS, Schedule 40 for all pipe sizes, conforming to ASTM A312 – UNS Alloy S31603 for ¼" to 30" diameter seamless and welded austenitic stainless steel piping. Stainless steel fittings shall be manufactured in accordance with ASTM A403 for wrought austenitic stainless steel piping fittings. Connections shall be welded or flanged with beveled ends for pipe larger than 2" diameter and plain ends for pipe smaller than 2" diameter.
3. Stainless steel flanged connections shall be provided, at a minimum, at piping connections to equipment, tanks, in-line specialties and all valves. Unions shall not be used at any piping connections. All flanges shall be weld neck type and flanged connections shall include a viton gasket between pipe materials. Threaded pipe, gauge or instrument connections shall be made using stainless steel, shop welded to the pipe at the locations shown on the drawings.
4. Stainless steel tubing for air service shall be rated for 150 psi minimum and shall have 0.032" minimum wall thickness, Seamless, ASTM A269 GR. TP 316, Soft Annealed 316 Stainless Steel. Compression fittings shall be flareless, consisting of type 316 stainless steel body, nut and ferrules. Acceptable manufacturer's include Swagelock, Gyrolock or A-Lock.
5. Polyvinyl chloride (PVC) piping shall be schedule 40. Acceptable joining methods include PVC solvent glue (fittings only). PVC pipe will be used as secondary containment piping only.
6. Ball valves shall be flanged ball valves with viton seals, unless otherwise specified on contract drawings. All valves shall be furnished with lockable handles.
7. Globe valves shall be manual globe valves with teflon seats, viton seals, and socket connections, as manufactured by asahi america or equal.

Above-ground Piping Installation

1. The CONTRACTOR shall provide adequate pipe supports for both horizontal and vertically-mounted pipes. For stainless steel piping, pipe supports shall be provided at a spacing of no more than 7 feet, and within 2 feet of all joints.
2. The piping shall be positioned to minimize tripping hazards and maintain head clearance where possible. Walkways shall be installed over pipes installed at ground level in foot-traffic areas.
3. Pressure gauges, flow meters, and other instrumentation shall be installed in locations that are easily readable and accessible for maintenance.
4. All pipe fittings and specials shall be carefully inspected in the field before installation. Cracked, broken, warped, out-of-round, damaged pipe joints including damaged pipelining or coatings or specials, as determined by the ENGINEER, shall not be installed. Such rejected pipe shall be clearly tagged in such a manner as to not deface or damage it, and the pipe shall then be removed from the job site by the CONTRACTOR or his own expense.
5. The underside of all overhead piping in treatment building shall be at least 7'-6" above finished floor.
6. The exact locations of drains, vents, sample taps, and pressure gauges shall be determined in the field during constructions.
7. Labeling of equipment and piping shall include, but not be limited to flow directional arrows, type of material being contained by piping, equipment identification placards, and safety placards.

Pipe Testing – For Air and Liquid Service

1. CONTRACTOR shall complete pipe tests for aboveground piping. The ENGINEER shall observe the pipe tests.
2. Pipe tests for liquid service shall be conducted using clean potable water. Pipe shall be capped before testing and equipment such as flow meters, pressure relief valves, etc., should be isolated to prevent damage. The piping system may be tested in sections with the approval from the ENGINEER. Hydrostatic tests will be completed at a pressure of 90 psi and will last for a minimum of 1 hour ar as much time as may be required to properly inspect all joints and connections. Hydrostatic test acceptance shall be +/- 5 percent of the pressure rating. Deviations regarding test pressure and times shall require approvals by the ENGINEER.
3. Leakage testing shall be conducted concurrently with the pressure test. The section tested shall be drip tight with no signs of leakage.
4. CONTRACTOR shall provide a pressure test of the air piping system. Isolate and equipment (e.g. air compressor, aeration defusers, etc.) that may be damaged by the test. The piping system may be tested in sections with approval from the ENGINEER. Stainless steel piping shall be tested at a pressure of 150 psi. Pressure test will last for a minimum of 1 hour. Hydrostatic test acceptance shall be +/- 5 percent of the pressure rating. Deviations regarding test pressure and times shall require approvals by the ENGINEER.
5. All containment pipe shall be pneumatically leak tested prior to being placed in service. test shall be at 10 psig for at least 2 hours.
6. If the test results are not considered to be acceptable by the ENGINEER, then the CONTRACTOR shall identify and repair the leaks. The pipe(s) must be re-tested after the repairs until acceptable test results are achieved.
7. Records of the pipe test shall be made by the CONTRACTOR of each pipe segment and submitted to the ENGINEER. The test records shall include the following:
a. Date of test
b. Description of pipe segment tested
c. Test pressure, air temperature, and time before and after test
d. Remarks (including description of test results, description of leaks, and leak repairs)
e. Signature of CONTRACTOR.

Welding Specifications

1. Welders shall be certified in accordance with ASME BPVC Sec IX (Boiler and Pressure Vessel Code Section IX, Welding and Brazing Qualifications – 2007). CONTRACTOR shall submit welding certificates for personnel.
2. Welding materials shall comply with Section 328.3 of ASME B31.3, Process Piping – 2006. Welding equipment, electrodes, welding wire, and fluxes shall be capable of producing satisfactory welds when used by a qualified welder using qualified procedures.
3. Welding preparations, preheating, welding execution, heat treatment, assembly, and erection of piping shall be performed in accordance with ASME B31.3, Process Piping – 2006.
4. CONTRACTOR shall minimize the number and location of field welds required for assembly of process piping.
5. CONTRACTOR shall be responsible for field verification of all piping lengths for shop fabrication.
6. No welding shall be performed when the quality of the completed weld may be impaired by the prevailing working or weather conditions.
7. Welds shall be visually inspected as follows:
a. Before welding for compliance with requirements for joint preparation, alignment, cleanliness, etc.
b. After welding for cracks, contour, finish, undercutting, overlap, and size of fillet welds.
8. Ten percent of welds shall be tested using radiography to verify completion.

Restoration of Surfaces

1. All types of surfaces, pavement, sidewalks, curbs, gutters, culverts and other features disturbed, damaged, or destroyed during the performance of work shall be restored. The quality of materials and the work used in the restoration shall produce a surface or feature equivalent or superior to the prior existing conditoin subject to approval by ENGINEER and OWNER. Replacement paving for asphalt surfaces shall be as shown on construction drawings. If concrete is used to replace asphalt CONTRACTOR shall paint concrete surface to match asphalt.
2. Cuttings and excavated materials stored onsite, in an area designated by ENGINEER, shall be covered and/or contained to prevent contact with ground, personnel, and runoff water.
3. All construction debris shall be disposed of after the completion of work, including but not limited to soil, rubble, asphalt, concrete, pipe, etc. The disposal of all construction debris shall be at a licensed waste disposal/treatment facility.

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No.	Date	Revisions	By	Ckd
2	9/19/08	ISSUE TO FLORIDA DEP	MS	JB
1	9/10/08	AERATION SYSTEM REDESIGN	MS	JB
0	9/4/08	PRELIMINARY CONCEPT REVIEW	JR	JB

Professional Engineer's Name: JAMES MICHAEL BEDESSEM
Professional Engineer's No.: 55694
State: FL | Date Signed: | Project Mgr.: DS
Designed by: JB | Drawn by: MS | Checked by: DS

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NUMBER 7917

FORMER AMERICAN BERYLLIUM COMPANY SITE • TALLEVAST, FLORIDA
CONSTRUCTION DRAWINGS

GENERAL INFORMATION AND SPECIFICATIONS

GENERAL

ARCADIS Project No.
B0038055.0002.00010

Date
SEPTEMBER 2008

ARCADIS
3350 BUSCHWOOD PARK DR.
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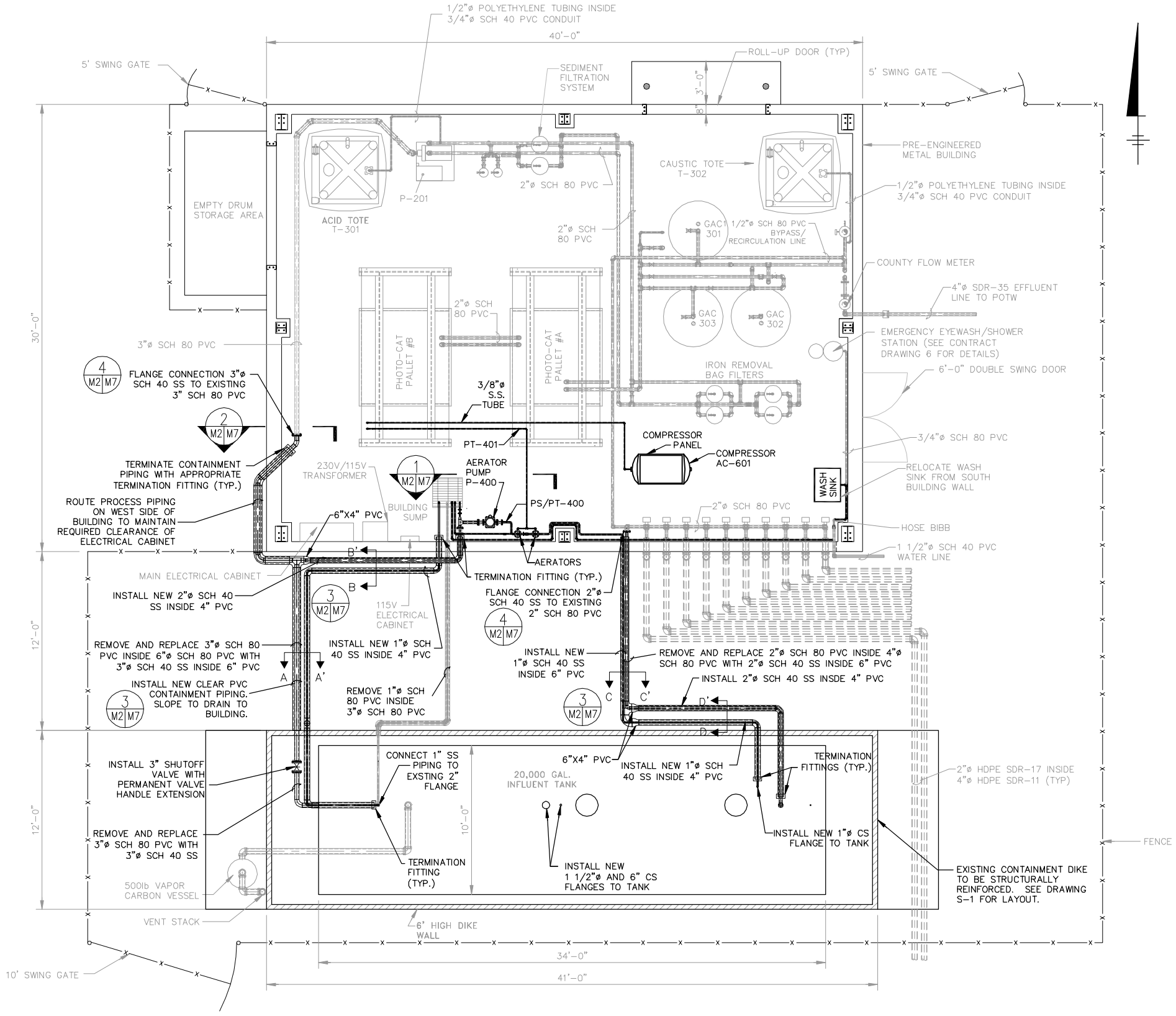
M-1



NOTES:

1. ALL THROTTLING/SHUT-OFF VALVES SHALL BE INSTALLED AT HEIGHT WHERE THEY CAN BE MANUALLY ACCESSED FROM FLOOR.
2. BOLD SECTIONS ARE PROPOSED LOCATIONS OF PIPE AND EQUIPMENT FOR IRON REMOVAL MODIFICATION.
3. EXISTING EQUIPMENT SHOWN IN GRAY FOR CLARITY.
4. INSTALL NEW CLEAR PVC CONTAINMENT PIPING. SLOPE TO DRAIN IN BUILDING.
5. ROUTE 4" CONTAINMENT PIPING UP OVER CONTAINMENT WALL AND INFLUENT TANK T-400. TERMINATE CONTAINMENT PIPING AT FLANGE FITTING ON TOP OF TANK.
6. CONNECT 6" CONTAINMENT PIPING TO EXISTING 6" FLANGE ON DIKE WALL.
7. TERMINATE CONTAINMENT PIPING 3" BEYOND CONTAINMENT CURB INSIDE BUILDING WITH APPROPRIATE TERMINATION FITTING.

1/4"=1'-0" (4' 0 4' 8')

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Professional Engineer's No.: 55694
State: FL | Date Signed: | Project Mgr.: DS
Designed by: JB | Drawn by: MS | Checked by: DS

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FORMER AMERICAN BERYLLIUM COMPANY SITE • TALLEVAST, FLORIDA
CONSTRUCTION DRAWINGS

EQUIPMENT LAYOUT FOR PROPOSED IRON REMOVAL MODIFICATIONS

GENERAL

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SEPTEMBER 2008

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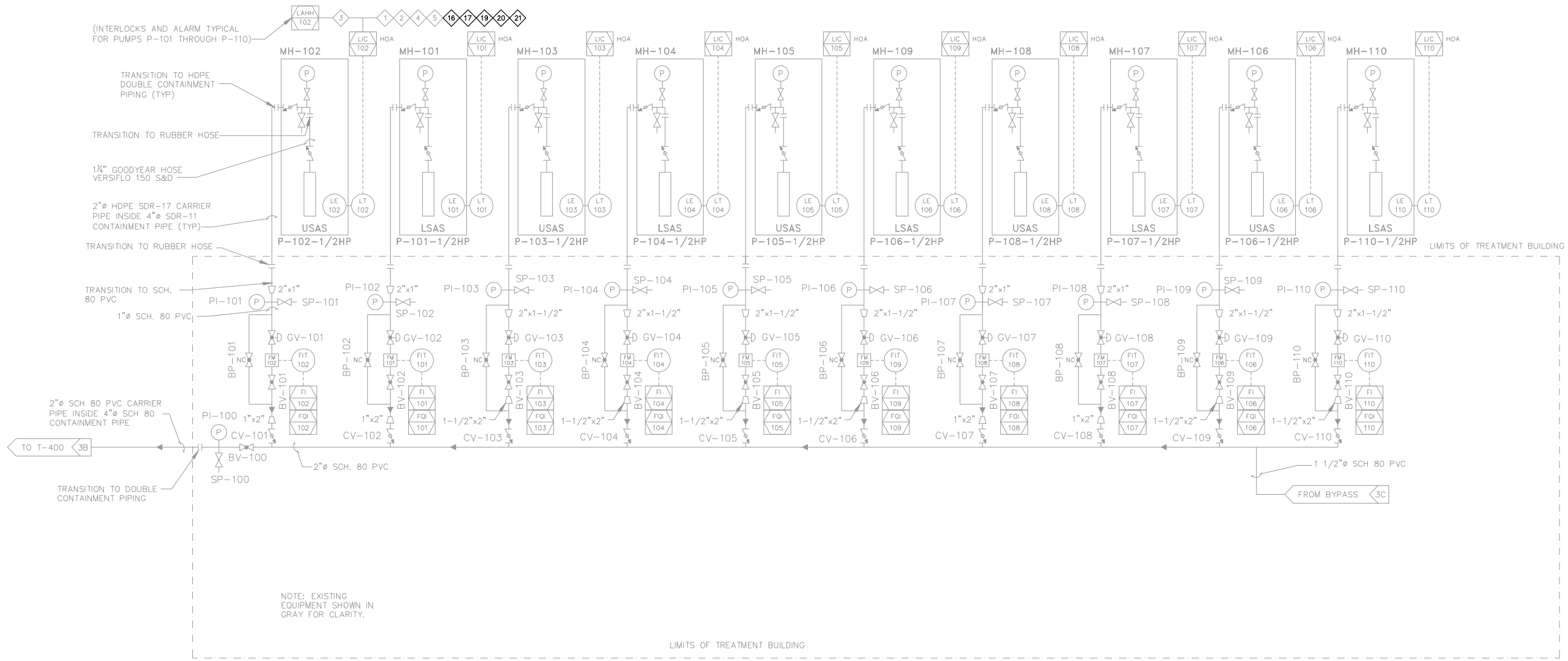
M-2



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Professional Engineer's Name: **JAMES MICHAEL BEDESSEM**
Professional Engineer's No.: 55694
State: FL | Date Signed: | Project Mgr.: DS
Designed by: JB | Drawn by: MS | Checked by: DS

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FORMER AMERICAN BERYLLIUM COMPANY SITE • TALLEVAST, FLORIDA
CONSTRUCTION DRAWINGS

PIPING AND INSTRUMENTATION DIAGRAM

GENERAL

ARCADIS Project No.
B0038055.0002.00010

Date
SEPTEMBER 2008

ARCADIS
3350 BUSCHWOOD PARK DR.
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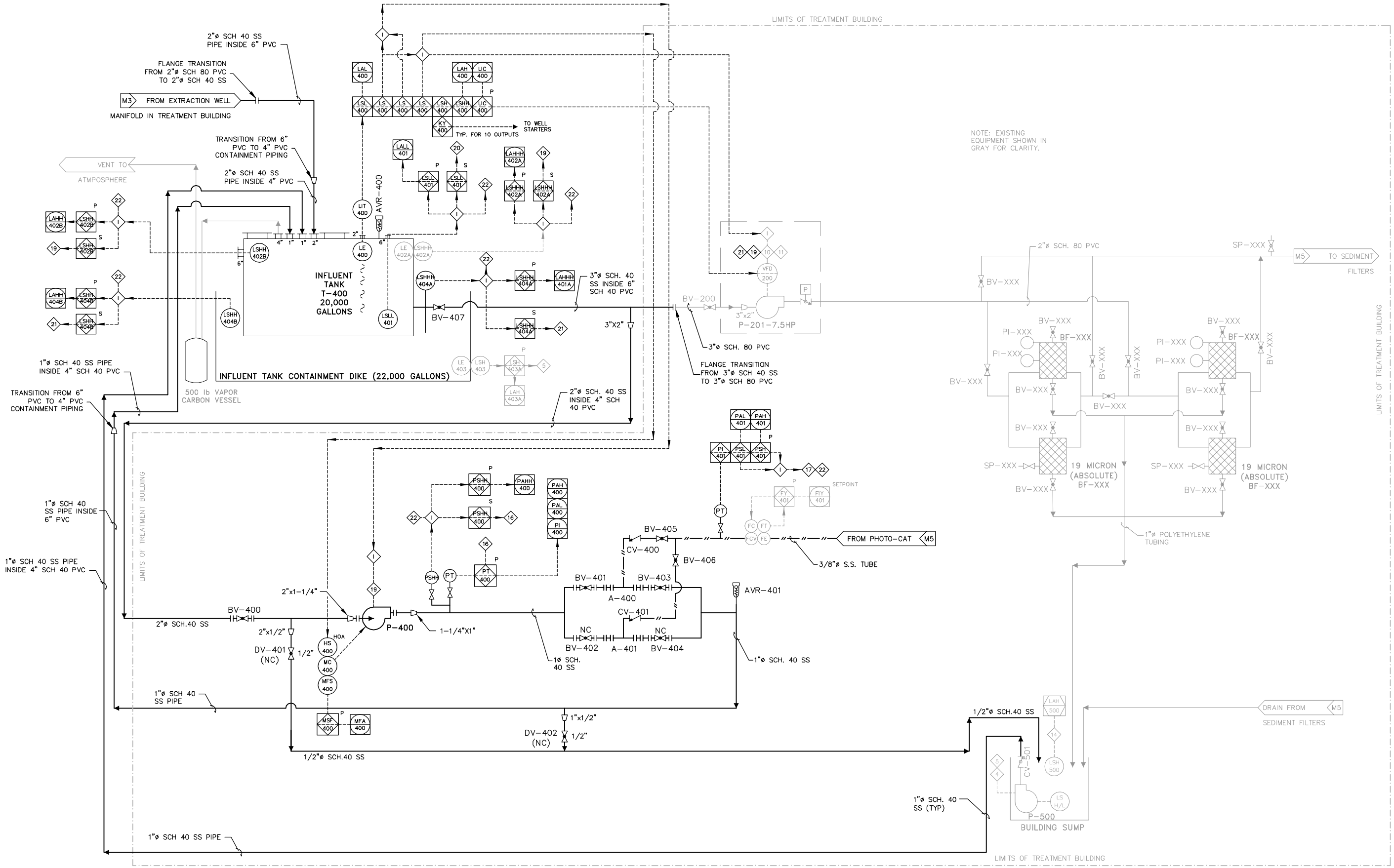
M-3



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Professional Engineer's Name
JAMES MICHAEL BEDESSEM
Professional Engineer's No.
55694

State	Date Signed	Project Mgr.
FL		DS
Designed by	Drawn by	Checked by
JB	MS	DS

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(813) 933-0697

M-4

LIMITS OF TREATMENT BUILDING

NOTE: EXISTING EQUIPMENT SHOWN IN GRAY FOR CLARITY.

DIAPHRAGM PUMP P-302

1/4" POLYETHYLENE TUBING

LT 301

CAUSTIC FEED TOTE T-301 330 GALLONS

P-301

LI 301

3/8" FLEXIBLE PNEUMATIC TUBING

AIR DRYER AD-600

PI

AIR COMPRESSOR AC-600

TO AERATOR M4

3/8"ø SS TUBE

AIR COMPRESSOR AC-601

3/8"ø SS TUBE

FI 200

FQI 200

FIT 200

FM 200

2"ø SCH. 80 PVC

SP-XXX

PHOTO-CAT PC-300 PALLET A P-202 7.5 HP

2"ø SS PIPING

PHOTO-CAT PC-300 PALLET B

BV-XXX

2"x1"

PI-301

SP-301

AR-301

SP-302

AR-302

SP-303

AR-303

SP-304

GRANULAR ACTIVATED CARBON GAC-301

GRANULAR ACTIVATED CARBON GAC-302

GRANULAR ACTIVATED CARBON GAC-303

BV-XXX

BYPASS TO EXTRACTION M3

WELL MANIFOLD

1 1/2"ø SCH 80 PVC (BY-PASS LINE)

3/8" POLYETHYLENE TUBING INSIDE 3/4" SCH 40 PVC CONDUIT

CV-301

1 1/2"ø SCH 80 PVC

AAH 301

AAL 301

12

13

3/8" POLYETHYLENE TUBING INSIDE 3/4" PVC CONDUIT

AR-304

2"ø SCH 80 PVC

PI-302

SP-305

CV-302

STATIC MIXER

2 1/2"ø SCH 40 STAINLESS STEEL

DISCHARGE TO POTW

4"ø SDR 35 PVC

2"x4"

BV-309

BV-308

SP-306

PI-303

AR-305

AE

AIT 302

AIC 302

DAI 302

AAH 302

15

AIC 301

BV-307

BV-XXX

FM

FIT 301

AAL 303

AAH 303

AIT 301

BV-305

TRANSITION TO SCH. 80 PVC

11

10

PAH 203

PAH 202

PI 209

DPI 203

PI 208

DPI 202

PI 207

PR-203

10 MICRON (ABSOLUTE) CF-201

BV-207

BV-205

DV-203

PR-201

1 MICRON (NOMINAL) BF-201

BV-203

BV-201

SP-201

DV-201

PT

TRANSITION TO SCH. 80 PVC

TRANSITION TO CHEMICAL HOSE

SP-203

PR-204

10 MICRON (ABSOLUTE) CF-202

BV-208

BV-206

DV-204

PR-202

1 MICRON (NOMINAL) BF-202

BV-204

BV-202

SP-202

DV-202

AIT 201

AE

STATIC MIXER

CV-201

TRANSITION TO SCH. 80 PVC

TRANSITION TO SS

FROM IRON REMOVAL FILTERS M4

AAH 201

AAL 201

8

9

AIC 201

10

11

P-202

ACID FEED TOTE T-201 330 GALLONS

LT 201

LI 201

DIAPHRAGM PUMP P-204

1/2" POLYETHYLENE TUBING

3/8" POLYETHYLENE TUBING INSIDE 3/4" SCH 40 PVC CONDUIT

2"ø SCH 80 PVC

1"ø POLYETHYLENE DRAIN TUBING

TO BUILDING SUMP M4

LIMITS OF TREATMENT BUILDING

LIMITS OF TREATMENT BUILDING

LIMITS OF TREATMENT BUILDING

NOT TO SCALE

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
2	9/19/08	ISSUE TO FLORIDA DEP	MS	JB
1	9/10/08	AERATION SYSTEM REDESIGN	MS	JB
0	9/4/08	PRELIMINARY CONCEPT REVIEW	JR	JB

Professional Engineer's Name: JAMES MICHAEL BEDESSEM

Professional Engineer's No.: 55694

State	Date Signed	Project Mgr.
FL		DS

Designed by	Drawn by	Checked by
JB	MS	DS

ARCADIS

ARCADIS U.S., INC.
FLORIDA CERTIFICATE OF AUTHORIZATION NUMBER 7917

FORMER AMERICAN BERYLLIUM COMPANY SITE • TALLEVAST, FLORIDA

CONSTRUCTION DRAWINGS

PIPING AND INSTRUMENTATION DIAGRAM

GENERAL

ARCADIS Project No.
B0038055.0002.00010

Date
SEPTEMBER 2008

ARCADIS
3350 BUSCHWOOD PARK DR.
SUITE 100
TAMPA, FLORIDA 33618
(813) 933-0697

M-5

INTERLOCKS:

1. HIGH LEVEL AT EXTRACTION WELL (MH-101 THROUGH MH-110), TURN ON RESPECTIVE PUMP (P-101 THROUGH P-110). IF PLC DOES NOT REGISTER FLOW AT RESPECTIVE FLOW METER (FIT-101 THROUGH FIT-110), TURN OFF PUMP.
2. LOW LEVEL AT EXTRACTION WELL (MH-101 THROUGH MH-110), TURN OFF RESPECTIVE PUMP (P-101 THROUGH P-110).
3. HIGH HIGH LEVEL AT EXTRACTION WELL (MH-101 THROUGH MH-110), SIGNAL ALARM AT PLC (LAHH-101 THROUGH LAHH-110). PLC TO SIGNAL AUTO DIALER.
4. HIGH LEVEL ALARM (LAH-400) AT INFLUENT TANK T-400. TURN OFF EXTRACTION WELL PUMPS P-101 THROUGH P-110 AND SUMP PUMP P-500. SIGNAL ALARM AT PLC (LAH-400). PLC TO SIGNAL AUTO DIALER.
5. HIGH LEVEL ALARM (LAH-403) AT INFLUENT TANK T-400 CONTAINMENT DIKE. TURN OFF EXTRACTION WELL PUMPS P-101 THROUGH P-110 AND SUMP PUMP P-500. SIGNAL ALARM AT PLC (LAH-403). PLC TO SIGNAL AUTO DIALER.
6. PUMP OFF SET POINT AT INFLUENT TANK (T-400). TURN OFF P-201 AND P-400.
7. PUMP ON SET POINT AT INFLUENT TANK (T-400). TURN ON P-201.
8. PH ALARM HIGH (AAH-201) AT ACID INJECTION POINT. TURN OFF PUMPS P-201, P202, P-400, P-500, AND PHOTOCAT UNIT. SIGNAL ALARM AT PLC. PLC TO SIGNAL AUTO DIALER.
9. PH ALARM LOW (AAL-201) AT ACID INJECTION POINT. TURN OFF PUMPS P-201, P202, P-400, P-500, AND PHOTOCAT UNIT. SIGNAL ALARM AT PLC. PLC TO SIGNAL AUTO DIALER.
10. HIGH DIFFERENTIAL PRESSURE ALARM (PAH-202) ACROSS BAG FILTERS (BF-201 AND BF-202). SIGNAL ALARM AT PLC. PLC TO SIGNAL AUTO DIALER.
11. HIGH DIFFERENTIAL PRESSURE ALARM (PAH-203) ACROSS CARTRIDGE FILTERS (CF-201 AND CF-202). SIGNAL ALARM AT PLC. PLC TO SIGNAL AUTO DIALER.
12. PH ALARM HIGH (AAH-301) AT CAUSTIC INJECTION POINT. TURN OFF PUMPS P-201, P202, P-400 AND P-500. SIGNAL ALARM AT PLC. PLC TO SIGNAL AUTO DIALER.
13. PH ALARM LOW (AAL-301) AT CAUSTIC INJECTION POINT. TURN OFF PUMPS P-201, P-202, P-400 AND P-500. SIGNAL ALARM AT PLC. PLC TO SIGNAL AUTO DIALER.
14. HIGH LEVEL ALARM (LAH-500) AT BUILDING SUMP. TURN OFF PUMPS P-101 THROUGH P-110, P-201, P-202, P-400, P-500, AND PHOTOCAT SYSTEM. SIGNAL ALARM AT PLC. PLC TO SIGNAL AUTO DIALER.
15. HIGH DIFFERENTIAL pH ALARM (AAH-302) ACROSS EFFLUENT pH PROBES. TURN OFF PUMPS P-201, P-202, P-400, P-500 AND PHOTO-CAT SYSTEM. SIGNAL ALARM AT PLC. PLC TO SIGNAL AUTO DIALER.
16. HIGH/LOW PRESSURE IN AERATOR PIPING (PAH-400, PAL-400, PAHH-400). TURN OFF PUMPS P-101 THROUGH P-110, P-201, P-202, P-400, P-500, AND PHOTOCAT SYSTEM. SIGNAL ALARM AT PLC. PLC TO SIGNAL AUTO DIALER.
17. HIGH/LOW PRESSURE IN AIR LINE TO AERATOR PIPING (PAH-401, PAL-401). TURN OFF PUMPS P-101 THROUGH P-110, P-201, P-202, P-400, P-500, AND PHOTOCAT SYSTEM. SIGNAL ALARM AT PLC. PLC TO SIGNAL AUTO DIALER.
18. PUMP ON SET POINT AT INFLUENT TANK (T-400). TURN ON P-400.
19. HIGH/HIGH LEVEL ALARM (LAHHH-402A AND LAHH-402B) AT INFLUENT TANK T-400. TURN OFF PUMPS P-201, P-202, P-400, P-500, EXTRACTION WELL PUMPS P-101 THROUGH P-110 AND PHOTO-CAT SYSTEM.
20. LOW/LOW LEVEL ALARM (LALL-401) AT INFLUENT TANK T-400. TURN OFF EXTRACTION WELL PUMPS P-101 THROUGH P-110, PUMPS P-201, P-202, P-400, P-500, AND PHOTO-CAT SYSTEM.
21. HIGH/HIGH ALARM (LAHHH-404A, LAHH-404B) AT INFLUENT CONTAINMENT DIKE. TURN OFF EXTRACTION WELL PUMPS P-101 THROUGH P-110, PUMPS P-201, P-202, P-400, P-500 AND PHOTO-CAT SYSTEM. SIGNAL ALARM AT PLC.
22. SIGNALS ALARM AT AUTODIALER.

LEGEND:

- PROCESS PIPING
- FUTURE PIPING/EQUIPMENT
- PNUEMATIC PIPING
- SKID MOUNTED EQUIPMENT
- BUILDING PERIMETER
- FENCE
- BALL VALVE
- GLOBE VALVE
- BALL CHECK VALVE
- SWING CHECK VALVE
- SAMPLE TAP
- PRESSURE GUAGE
- ANALYZER ELEMENT (AE)
- FLOW METER (FM)
- FLANGED CONNECTION
- REDUCER
- FEMALE HOSE FITTING
- CENTRIFUGAL PUMP
- DIAPHRAM PUMP
- METERING PUMP
- INSTRUMENT SIGNAL
- PLC CONTROLLER
- LOCAL CONTROL PANEL
- LOCAL FIELD MOUNT
- PLC INTERLOCK
- PRESSURE RELIEF VALVE (PRV)
- PNEUMATIC ACCUTATOR (P)
- MALE HOSE FITTING
- FLEXIVLE HOSE
- CONTACT PIPING
- PURIFICS IN-LINE AERATOR
- AIR RELEASE
- AIR/VACUUM RELEASE

ABBREVIATIONS:

A	AERATOR
AAH	pH ANALYZER ALARM HIGH
AAL	pH ANALYZER ALARM LOW
AC	AIR COMPRESSOR
AD	AIR DRYER
AE	pH ANALYZER ELEMENT
AI	pH ANALYZER INDICATOR
AIT	pH ANALYZER INDICATING TRANSMITTER
AR	AIR RELEASE
AVR	AIR/VACUUM RELEASE
BF	BAG FILTER
BP	BY-PASS
BV	BALL VALVE
CV	CHECK VALVE
DAI	DIFFERENTIAL pH INDICATOR
DPI	DIFFERENTIAL PRESSURE INDICATOR
DS	DISCONNECT SWITCH
DWG	DRAWING
GAC	GRANULAR ACTIVATED CARBON
GV	GLOBE VALVE
HDPE	HIGH DENSITY POLYETHYLENE
MH	MANHOLE
NC	NORMALLY CLOSED
P	PRIMARY PLC
PC	PHOTO-CAT
PCV	PRESSURE CONTROL VALVE
PI	PRESSURE INDICATOR
POTW	PUBLICLY OWNED TREATMENT WORKS
PRV	PRESSURE REGULATING VALVE
PVC	POLYVINYL CHLORIDE PIPE
S	SECONDARY PLC
SCH	SCHEDULE
SDR	STANDARD DIMENSIONAL RATIO
SP	SAMPLE PORT
T	TANK
TYP	TYPICAL
VFD	VARIABLE FREQUENCY DRIVE
ø	DIAMETER

INSTRUMENT IDENTIFICATION LETTERS

FIRST LETTER		SUCCEEDING LETTERS		
MEASURE OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A = ANALYSIS		ALARM		
B = BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C = USER'S CHOICE			CONTROL, CLOSED	
D = USER'S CHOICE	DIFFERENTIAL			
E = VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F = FLOW RATE	RATIO (FRACTION)			
G = USER'S CHOICE		GLASS, VIEWING DEVICE		
H = HAND				HIGH
I = CURRENT (ELECTRICAL)		INDICATE		
J = POWER	SCAN			
K = TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L = LEVEL		LIGHT		LOW
M = USER'S CHOICE	MOMENTARY			MIDDLE, INTERMEDIATE
N = USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O = USER'S CHOICE		ORIFICE, RESTRICTION	OPEN	
P = PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q = QUANTITY	INTERGRATE, TOTALIZE			
R = RADIATION		RECORD	RUN	
S = SPEED, FREQUENCY	SAFETY	SWITCH	STOP	
T = TEMPERATURE			TRANSMIT	
U = MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V = VIBRATION, MECH. ANALYSIS			VALVE, DAMPER, LOUVER	
W = WEIGHT, FORCE		WELL		
X = UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y = EVENT, STATUS OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z = POSITION, DIMENSION	Z AXIS		DRIVE, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

NOTES:

1. ANY FIRST LETTER COMBINED WITH MODIFIER REPRESENTS A NEW AND SEPARARE MEASURED VARIABLE. EXAMPLES: PD = DIFFERENTIAL PRESSURE FQ = TOTALIZED OR INTEGRATED FLOW. EXCEPTION IS THE MODIFIER "J" FOR MULTIPOINT SCANNING.
2. FOR ANALYSIS NOT IDENTIFIED BY A SPECIFIC LETTER IN THE TABLE, USE FIRST LETTER "A" NEAR THE INSTRUMENT SYMBOL, SPECIFY THE NATURE OF THE ANALYSIS. EXAMPLE: PH
3. MEANING OF A "USER CHOICE" LETTER SHALL BE CONSISTENT THROUGHOUT A PROJECT, AND SHALL BE SPECIFIED IN THE DRAWING LEGEND.
4. UNCLASSIFED LETTER MAY HAVE A FEW DIFFERENT MEANINGS ON A PROJECT, THE MEANING SHALL BE SPCIFIED NEAR EACH INSTRUMENT SYMBOL USING THE UNCLASSIFIED LETTER.
5. THE MODIFIER "SCAN" APPLIES TO MULTIPOINT PRINTING INSTRUMENTS, SUCH AS CJRS (MULTIPOINT CONDUCTIVITY RECORDER WITH ALARM SWITCHES).

INSTRUMENT SYMBOLS

	PRIMARY CONTROL PANEL NORMALLY ACCESSIBLE TO OPERATOR	FIELD MOUNTED	AUXILIARY PANEL OR RACK NORMALLY ACCESSIBLE TO OPERATOR
DISCRETE INSTRUMENTS	⊖	○	⊖
SHARED DISPLAY, SHARED CONTROL	⊜	◎	⊜
COMPUTER FUNCTION INCLUDING DISTRIB. CNTL. SYS.	⬡	⬡	⬡
PROGRAMMABLE LOGIC CONTROLLER FUNCTION	◇	◇	◇

GENERAL NOTES:

1. ALL ANALOG SETPOINTS SHALL BE FIELD ADJUSTED BY OPERATOR AT HMI INTERFACE SCREEN.
2. ALARMS THAT SHUT DOWN EXTRACTION WELLS AND TREATMENT EQUIPMENT MUST BE CLEARED BY OPERATOR BEFORE BEING RESTARTED.
3. THIS DRAWING IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY.

CITY: DIV/GROUP: DB: LD: PIC: PM: TM: LYR:ON=*;OFF=*REF* PAGESETUP: ---- PLOTSTYLETABLE: BLACKGRAY.CTB PLOTTED: 9/19/2008 2:09 PM BY: SEPPANEN, MAIJA
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XREFS: IMAGES: PROJECTNAME: ----
3805IX00

NOT TO SCALE

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Professional Engineer's Name: JAMES MICHAEL BEDESSEM
Professional Engineer's No.: 55694

State	Date Signed	Project Mgr.
FL		DS

Designed by	Drawn by	Checked by
JB	JAR	DS

ARCADIS
ARCADIS U.S., INC.
FLORIDA CERTIFICATE OF AUTHORIZATION NUMBER 7917

FORMER AMERICAN BERYLLIUM COMPANY SITE • TALLEVAST, FLORIDA
CONSTRUCTION DRAWINGS

INTERLOCKS, LEGEND AND ABBREVIATIONS

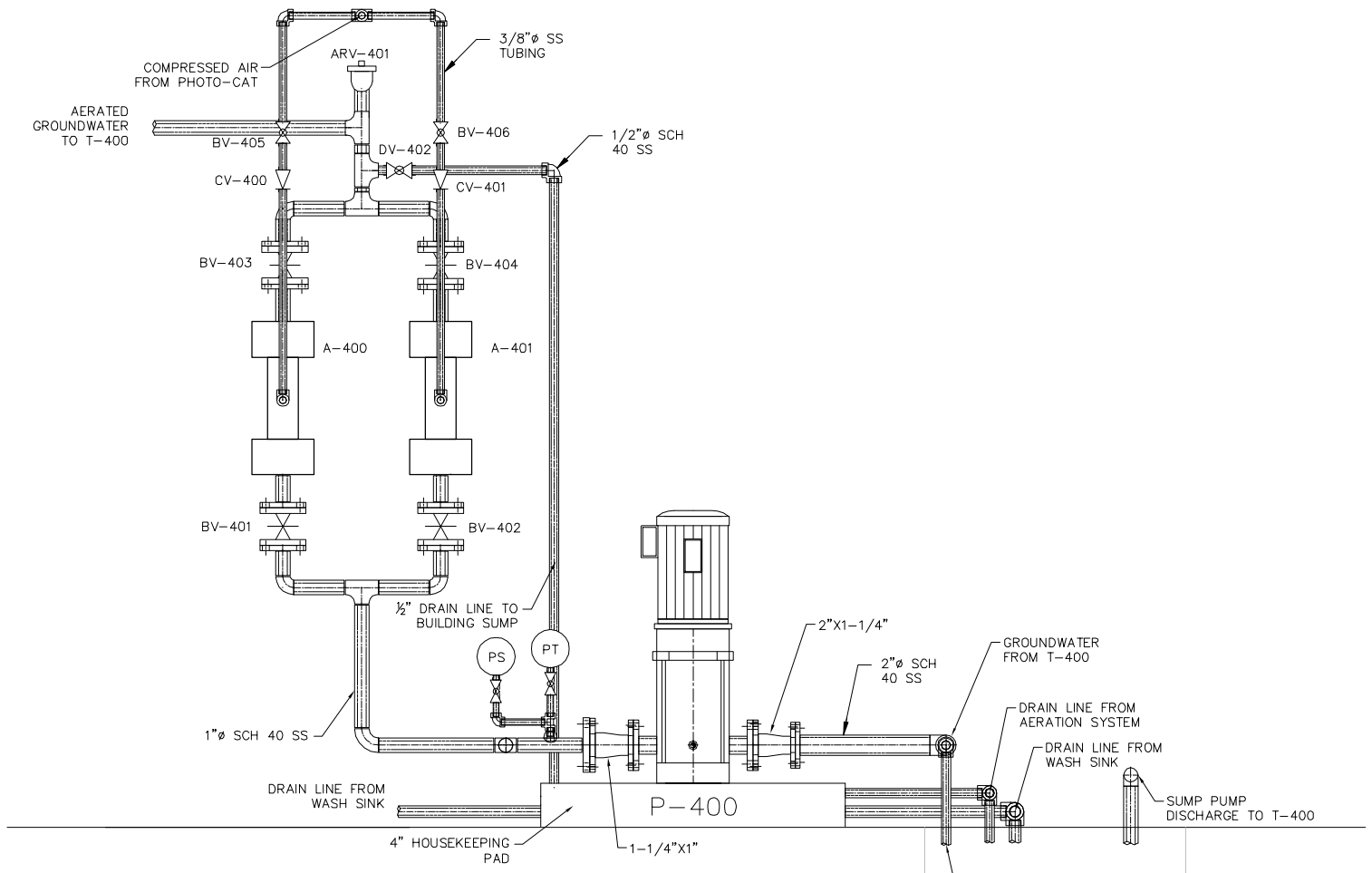
GENERAL

ARCADIS Project No.
B0038055.0002.00010

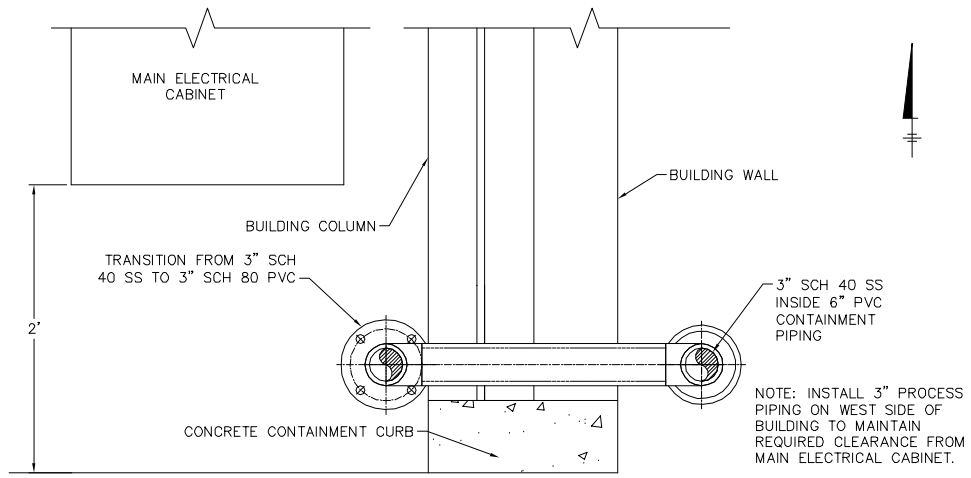
Date
SEPTEMBER 2008

ARCADIS
3350 BUSCHWOOD PARK DR.
SUITE 100
TAMPA, FLORIDA 33618
(813) 933-0697

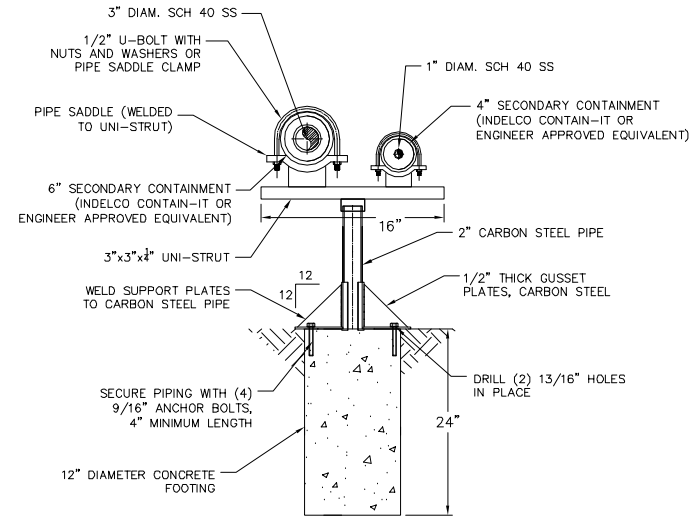
M-6



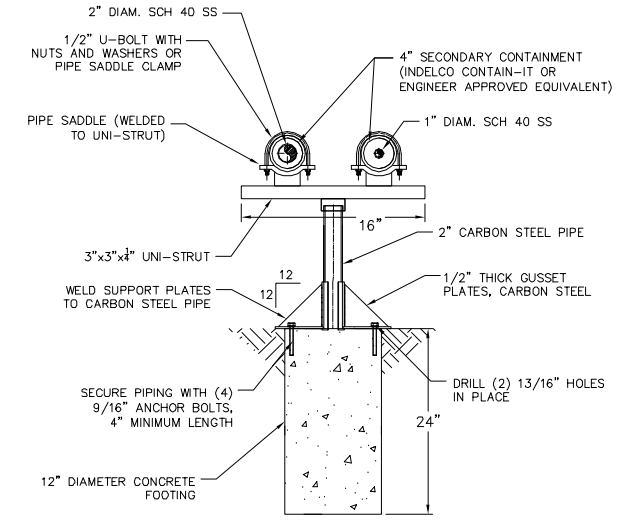
1 M2 M7 PROPOSED AERATION SYSTEM
NOT TO SCALE



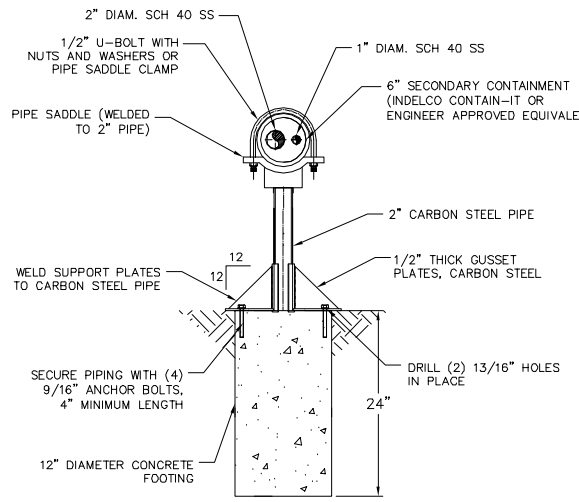
2 M2 M7 PIPING DETAIL
NOT TO SCALE



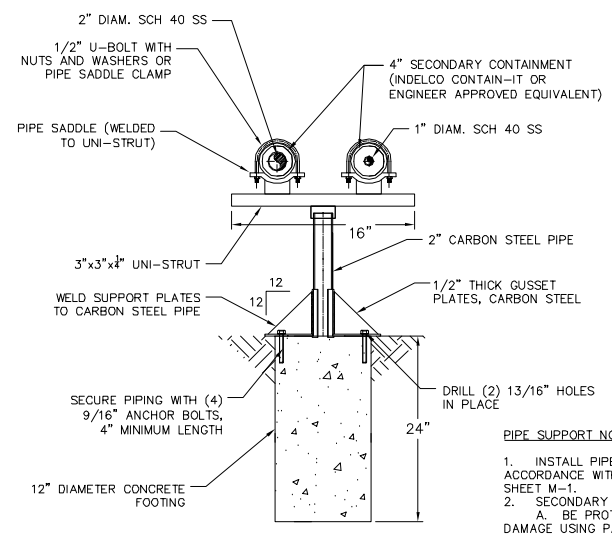
A-A'



B-B'



C-C'

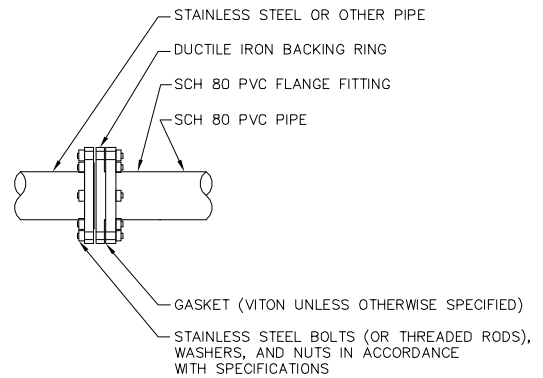


D-D'

3 M2 M7 PIPING SECTIONS
NOT TO SCALE

PIPE SUPPORT NOTES:

1. INSTALL PIPE SUPPORTS IN ACCORDANCE WITH INSTRUCTIONS ON SHEET M-1.
2. SECONDARY CONTAINMENT SHALL:
   A. BE PROTECTED AGAINST UV DAMAGE USING PAINT, UV-RESISTANT PVC, PROTECTIVE COVERING, OR ENGINEER APPROVED EQUAL.
   B. ALLOW FOR VISUAL OBSERVATION OF PIPING FOR SIGNS OF LEAKAGE.



4 M2 M7 PIPE TRANSITION DETAIL (TYP.)
NOT TO SCALE

NOT TO SCALE

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Professional Engineer's Name: JAMES MICHAEL BEDESSEM
Professional Engineer's No.: 55694
State: FL | Date Signed | Project Mgr.: DS
Designed by: JB | Drawn by: MS | Checked by: DS

ARCADIS
ARCADIS U.S., INC.
FLORIDA CERTIFICATE OF AUTHORIZATION NUMBER 7917

FORMER AMERICAN BERYLLIUM COMPANY SITE • TALLEVAST, FLORIDA
CONSTRUCTION DRAWINGS

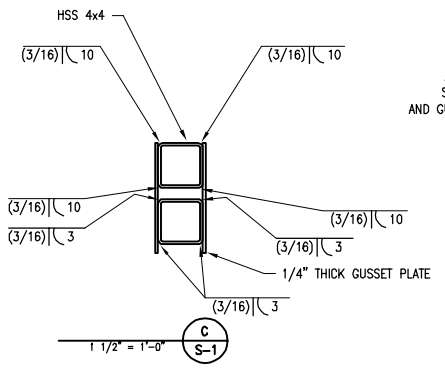
MECHANICAL DETAILS AND SECTIONS

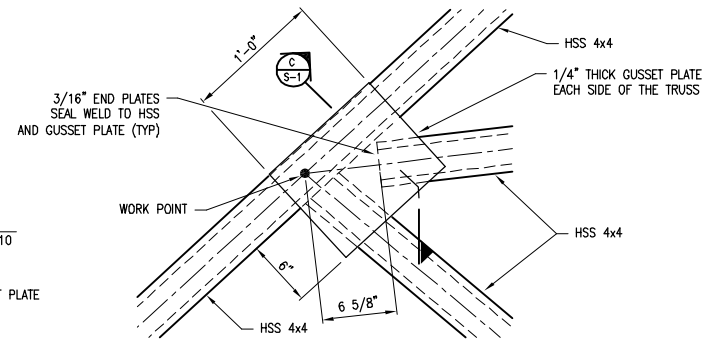
GENERAL

ARCADIS Project No.: B0038055.0002.00010
Date: SEPTEMBER 2008

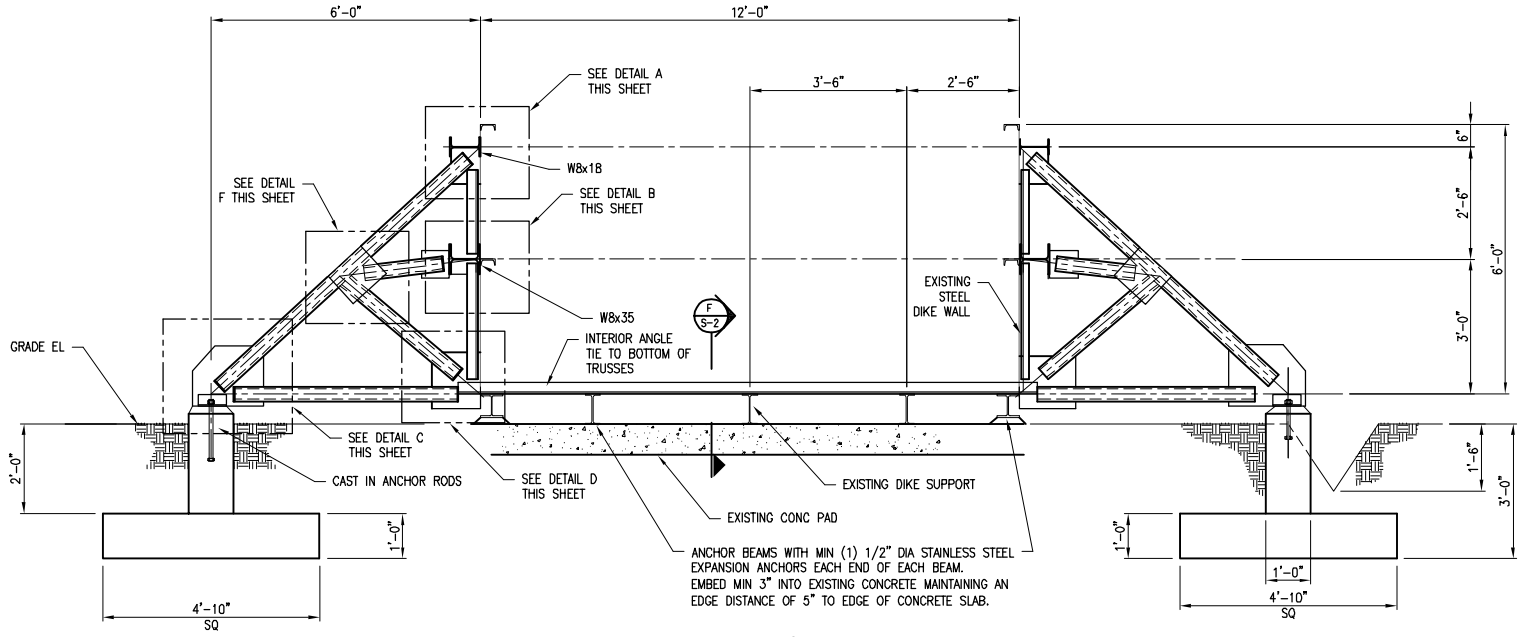
ARCADIS
3350 BUSCHWOOD PARK DR.
SUITE 100
TAMPA, FLORIDA 33618
(813) 933-0697

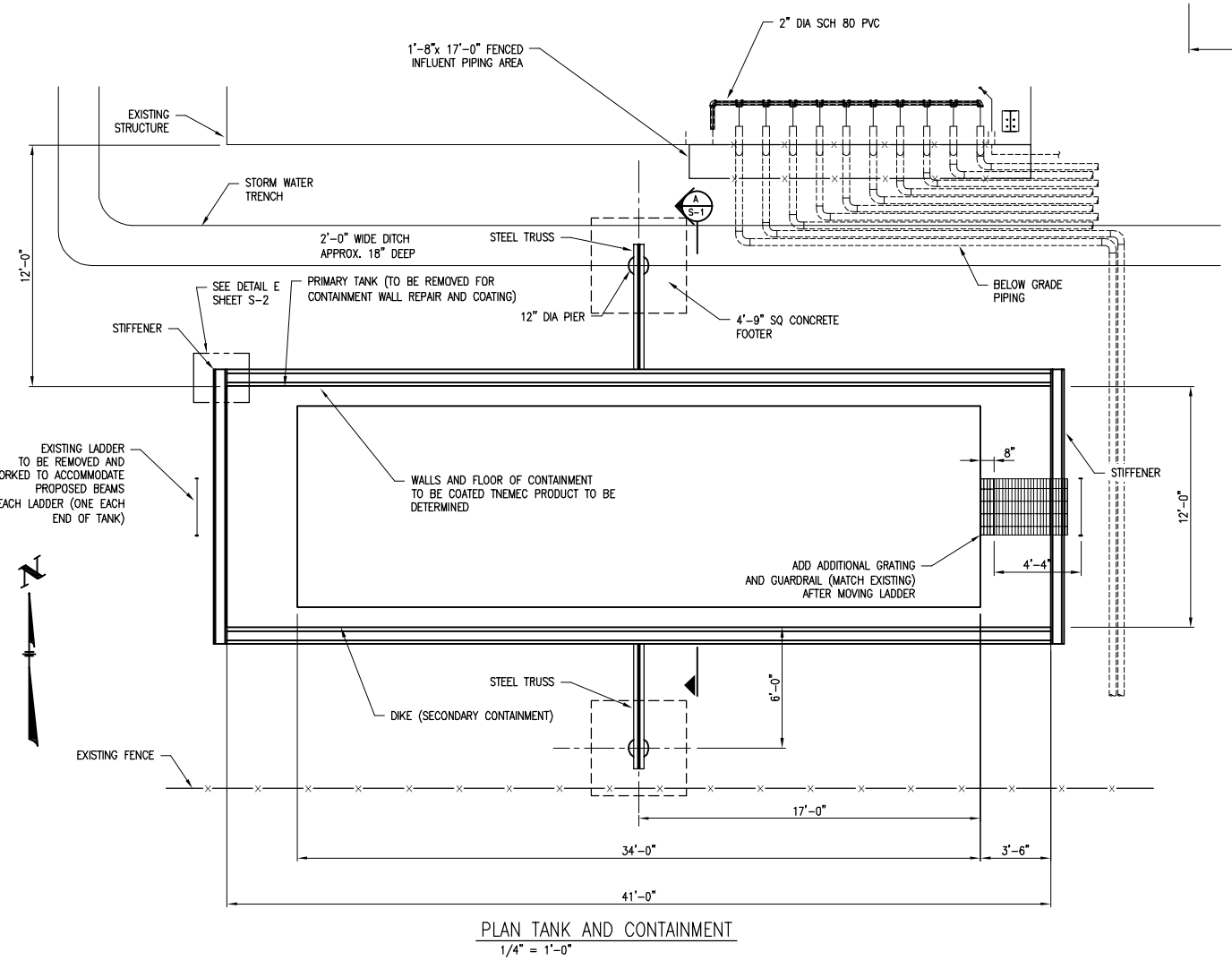
M-7



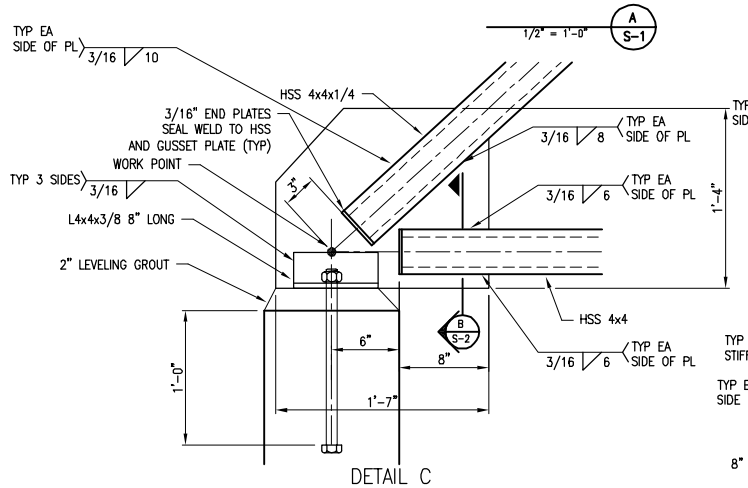


DETAIL F
1 1/2" = 1'-0"



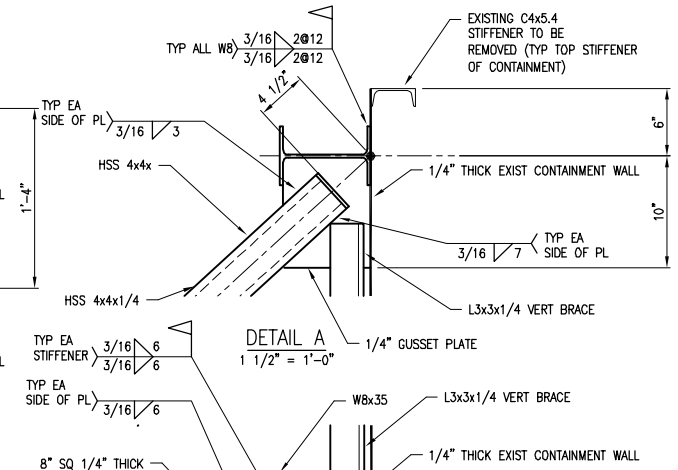


PLAN TANK AND CONTAINMENT
1/4" = 1'-0"

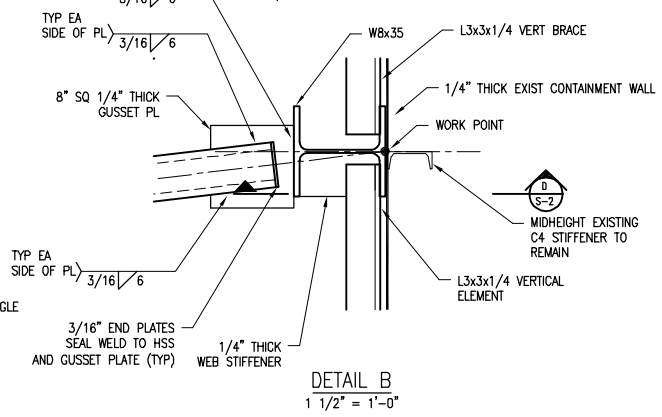


DETAIL C
1 1/2" = 1'-0"

DETAIL D
1 1/2" = 1'-0"



DETAIL A
1 1/2" = 1'-0"



DETAIL B
1 1/2" = 1'-0"

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING. USE TO VERIFY FIGURE REPRODUCTION SCALE

Professional Engineer's Name
AARON A. HUNT
Professional Engineer's No.
64507
State: FL
Date Signed:
Project Mgr.: DS
Designed by: AH
Drawn by: AH
Checked by: JB

ARCADIS
ARCADIS U.S., INC.
FLORIDA CERTIFICATE OF AUTHORIZATION
NUMBER 7917

FORMER AMERICAN BERYLLIUM COMPANY SITE • TALLEVAST, FLORIDA
CONSTRUCTION DRAWINGS

CONTAINMENT DIKE
STRUCTURAL IMPROVEMENT PLANS SECTIONS AND DETAILS

ARCADIS Project No.
B0038055.0002.00010
Date
AUGUST 2008

ARCADIS
3350 BUSCHWOOD PARK DR.
SUITE 100
TAMPA, FLORIDA 33618
(813) 933-0697

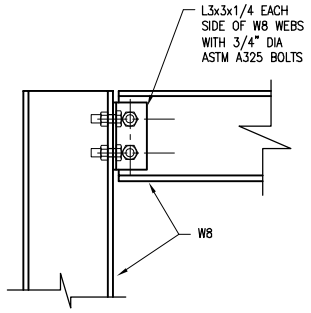
S-1

NOTES ON SPECIAL INSPECTIONS:
1. INSPECTIONS SHALL BE PERFORMED BY 3RD PARTY FIRM EXPERIENCED WITH CONSTRUCTION INSPECTION.
2. VISUALLY INSPECT EXISTING EXISTING WELDS ALONG CONTAINMENT WALL BASE SLAB (HORIZONTAL WELDS) AND CORNERS (VERTICAL WELDS). IN ADDITION, REVIEW ANY OTHER WELDS ALONG THE DIKE WALLS OR BASE PLATE. WELDS MUST BE WATERTIGHT.
3. PERIODICALLY OBSERVE FIELD WELDING OF PROPOSED MEMBERS TO DIKE WALLS.
4. PERIODICALLY OBSERVE HIGH STRENGTH BOLTING OF CONNECTIONS.
5. IDENTIFY MARKINGS AND VERIFY CONFORMANCE TO ASTM STANDARDS.
6. VERIFY FINAL CONNECTIONS COMPLY WITH DESIGN DOCUMENTS.
7. VERIFY MINIMUM NET ALLOWABLE BEARING CAPACITY OF 1500 PSF PRIOR TO PLACEMENT OF CONCRETE PIERS.
8. OBSERVE PLACEMENT OF ALL REINFORCEMENT AND CONCRETE.
9. LEAK TEST REQUIRED TO WATER DEPTH 5.5 FEET.
   - 9.1. OBSERVE EXTERIOR OF TANK AND NOTE POINTS OF LEAKING.
   - 9.2. TEST CONTAINMENT UNTIL LOSS OF 3/8" WATER DEPTH, OR 2 DAYS. WHICHEVER COMES FIRST.
   - 9.3. RECORD WATER TEMPERATURE EVERY 24 HOURS (SAME TIME EACH DAY) 18" BELOW WATER SURFACE IN LOCATIONS 180± APART.
   - 9.4. PROVIDE 2 GRADUATED CONTAINERS THAT FLOAT AT EACH FAR END OF TANK. FILL CONTAINERS AND RECORD ANY CHANGES IN WATER DEPTH OVER THE TEST PERIOD TO ACCOUNT FOR CHANGES IN PRECIPITATION AND/OR EVAPORATION.
   - 9.5. CALCULATED LOSS OF WATER DUE TO LEAKAGE, TAKING INTO ACCOUNT TEMPERATURE CHANGES AND EVAPORATION/PRECIPITATION, SHALL BE NO MORE THAN 15 GAL PER 24 HOUR PERIOD.

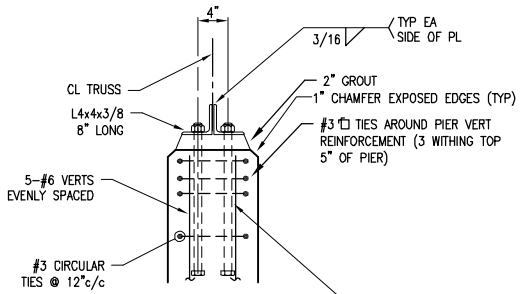
MATERIALS: FINAL PRODUCT AND WORKMANSHIP MUST BE AESTHETICALLY PLEASING
1. CONCRETE STRENGTH 4000 PSI AT 28 DAYS.
2. LEVELING GROUT MIN COMPRESSIVE STRENGTH 5000 PSI AT 28 DAYS.
3. PROVIDE CIRCULAR FORM FOR CONCRETE PIER CASTING. REMOVE FORM AND RUB ANY FINS AND FILL ANY VOIDS OR BUG HOLES. FINAL PRODUCT MUST BE AESTHETICALLY PLEASING.
4. ALL WIDE FLANGE MEMBERS ASTM A992.
5. ALL ANGLES AND PLATES SHALL BE ASTM A36.
6. ALL WELD FILLER E70XX.
7. ALL BOLTS ASTM A325-N.
8. ALL STEEL IS TO BE SHOP PRIMED AND FIELD PAINTED. ALL FIELD WELDS SHALL BE PREPPED AND FIELD PRIMED PRIOR TO TOP COAT. SPRAYING COATINGS, PRIMING, OR PAINT WILL NOT BE ACCEPTABLE.

WELDING AND BOLTING:
1. WELDERS SHALL BE QUALIFIED IN ACCORDANCE WITH AWS D1.1-98 PART C "PERFORMANCE QUALIFICATIONS" FOR INTENDED WORK. DOCUMENTATION MUST BE PRESENTED PRIOR TO WORK COMMENCEMENT.
2. BOLTS SHALL BE SNUG TIGHT.

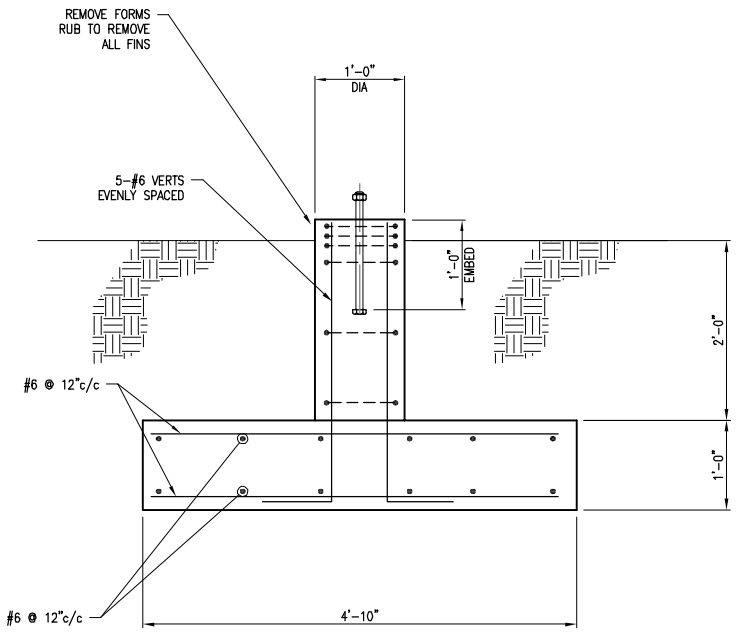
LOADING/DESIGN CRITERIA FLORIDA BUILDING CODE 2004 WITH AMENDMENTS:
1. BASIC WIND SPEED 130 MPH.
2. BUILDING CLASSIFICATION 2.
3. EXPOSURE CATEGORY "C".
4. IMPORTANCE FACTOR Iw = 1.0.
5. HYDRAULIC LOADING 6 FOOT DEPTH WITH AND WITHOUT WIND LOADS APPLIED IN SAME DIRECTION.
6. UNIFORM LATERAL WIND LOADING PRESSURE USED FOR DESIGN = 56.3 PSF WINDWARD AND SUCTION.



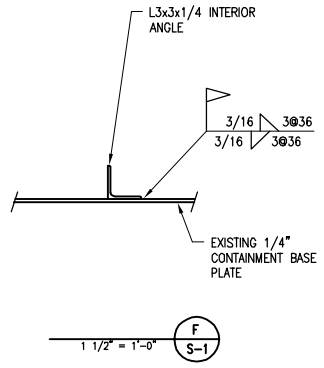
DETAIL E
1 1/2" = 1'-0"



TYP PIER DETAIL
1" = 1'-0"



TYP FOOTER DETAIL
1" = 1'-0"



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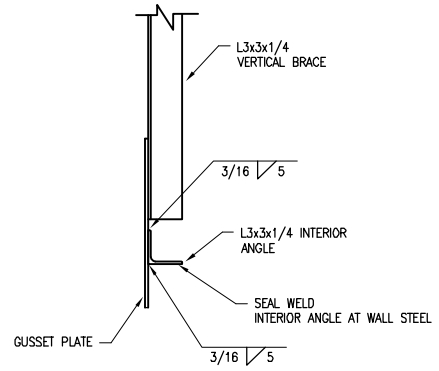

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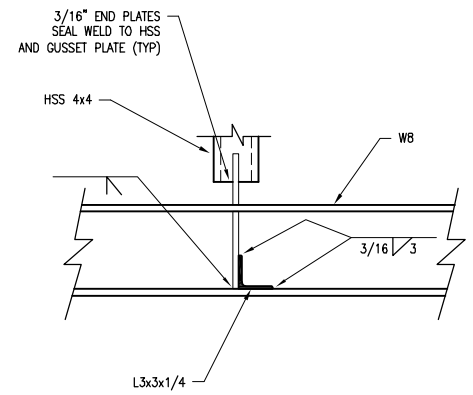

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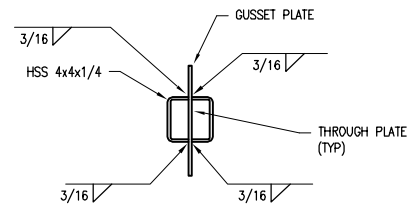


TYP HSS CONNECTION
1 1/2" = 1'-0" B S-1

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING. USE TO VERIFY FIGURE REPRODUCTION SCALE

Professional Engineer's Name: AARON A. HUNT
Professional Engineer's No.: 64507

State	Date Signed	Project Mgr.
FL		DS
Designed by	Drawn by	Checked by
AH	AH	JB

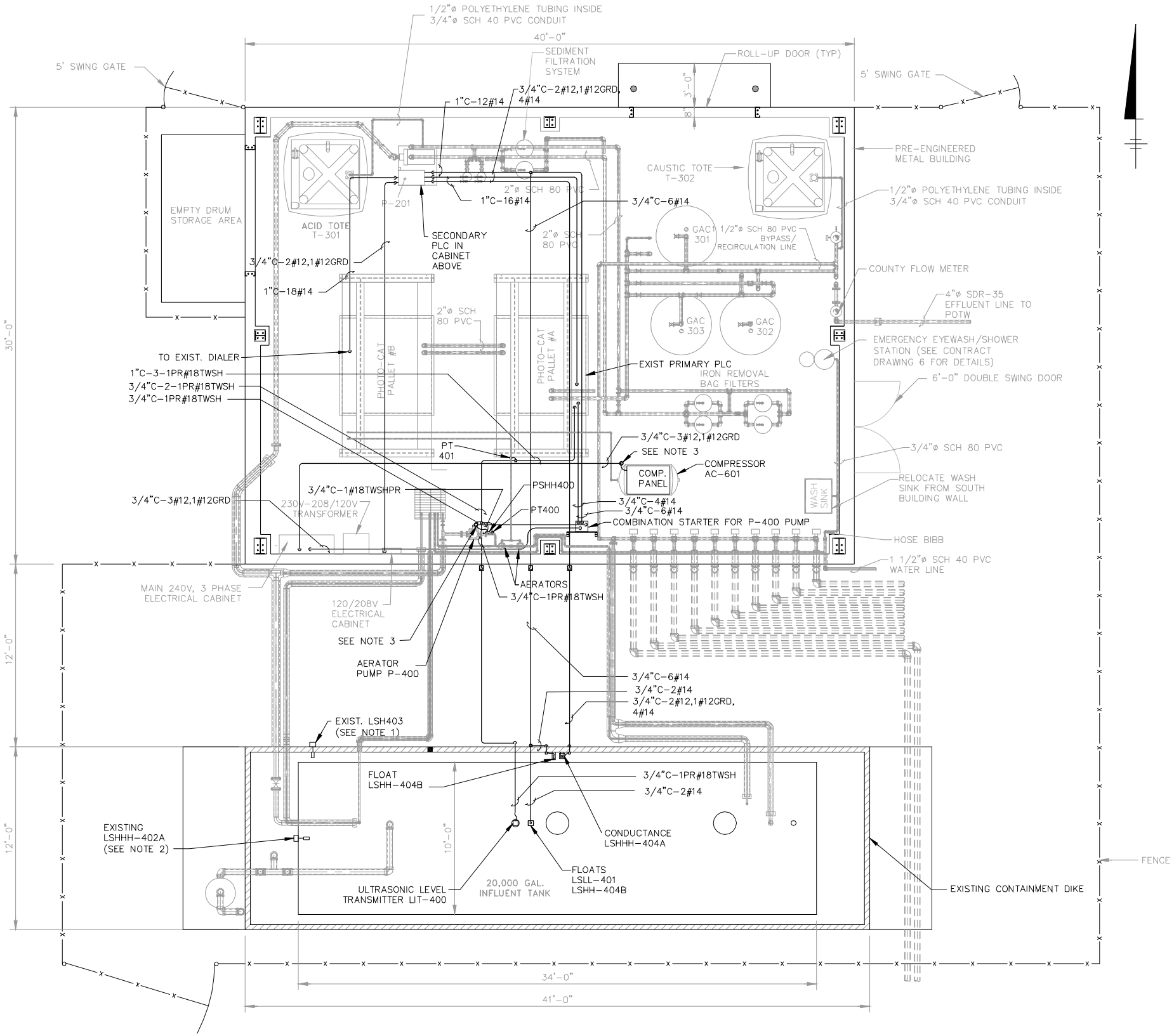
ARCADIS
ARCADIS U.S., INC.
FLORIDA CERTIFICATE OF AUTHORIZATION NUMBER 7917

FORMER AMERICAN BERYLLIUM COMPANY SITE • TALLEVAST, FLORIDA
CONSTRUCTION DRAWINGS
CONTAINMENT DIKE STRUCTURAL IMPROVEMENT PLANS AND DETAILS

ARCADIS Project No.: B0038055.0002.00010
Date: AUGUST 2008

ARCADIS
3350 BUSCHWOOD PARK DR.
SUITE 100
TAMPA, FLORIDA 33618
(813) 933-0697

S-2



NOTES:

1. CHANGE CONTACT FROM CLOSE ON RISING LEVEL TO OPEN ON RISING LEVEL. INSTALL MORE #14 AWG WIRES IN THE EXISTING CONDUIT. CONNECT TO THE SECOND FORM 'C' CONTACT 'OPEN ON RISING'. BRING THE NEW PAIR OF WIRES TO THE SECONDARY PLC VIA THE NEW CONDUIT INSTALLED BETWEEN THE SECONDARY PLC AND THE EXISTING PRIMARY PLC.
2. CHANGE CONTACT FROM CLOSE ON RISING LEVEL TO OPEN ON RISING LEVEL. INSTALL MORE #14 AWG WIRES IN EXISTING CONDUIT. CONNECT TO THE SECOND FORM 'C' CONTACT 'OPEN ON RISING'. BRING THE NEW PAIR OF WIRES TO THE SECONDARY PLC VIA THE NEW CONDUIT INSTALLED BETWEEN THE SECONDARY PLC AND THE EXISTING PRIMARY PLC.
3. ANCHOR CONDUIT TO FLOOR WITH A FLOOR FLANGE. INSTALL A 'T' CONDULET IN THE VERTICAL RUN NEAR PANEL. CONNECT FROM THE 'T' TO THE PANEL VIA LIQUIE TIGHT METAL FLEXIBLE CONDUIT.

CITY: DIV/GROUP: DB: LD: PIC: PM: TM: LYR:ON=*;OFF=*REF*
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XREFS: 3805X00 IMAGES: PROJECTNAME: ----

1/4"=1'-0" (4' 0 4' 8')

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No.	Date	Revisions	By	Ckd
2	9/19/08	ISSUE TO FLORIDA DEP	MEC	MEC
1	9/10/08	AERATION SYSTEM REDESIGN	MEC	MEC
0	9/4/08	PRELIMINARY CONCEPT REVIEW	JR	JB

Professional Engineer's Name: THEODORE M. COGSWELL
Professional Engineer's No.: 64401
State: FL | Date Signed: | Project Mgr.: DS
Designed by: MEC | Drawn by: MEC | Checked by: JB

ARCADIS
ARCADIS U.S., INC.
FLORIDA CERTIFICATE OF AUTHORIZATION NUMBER 7917

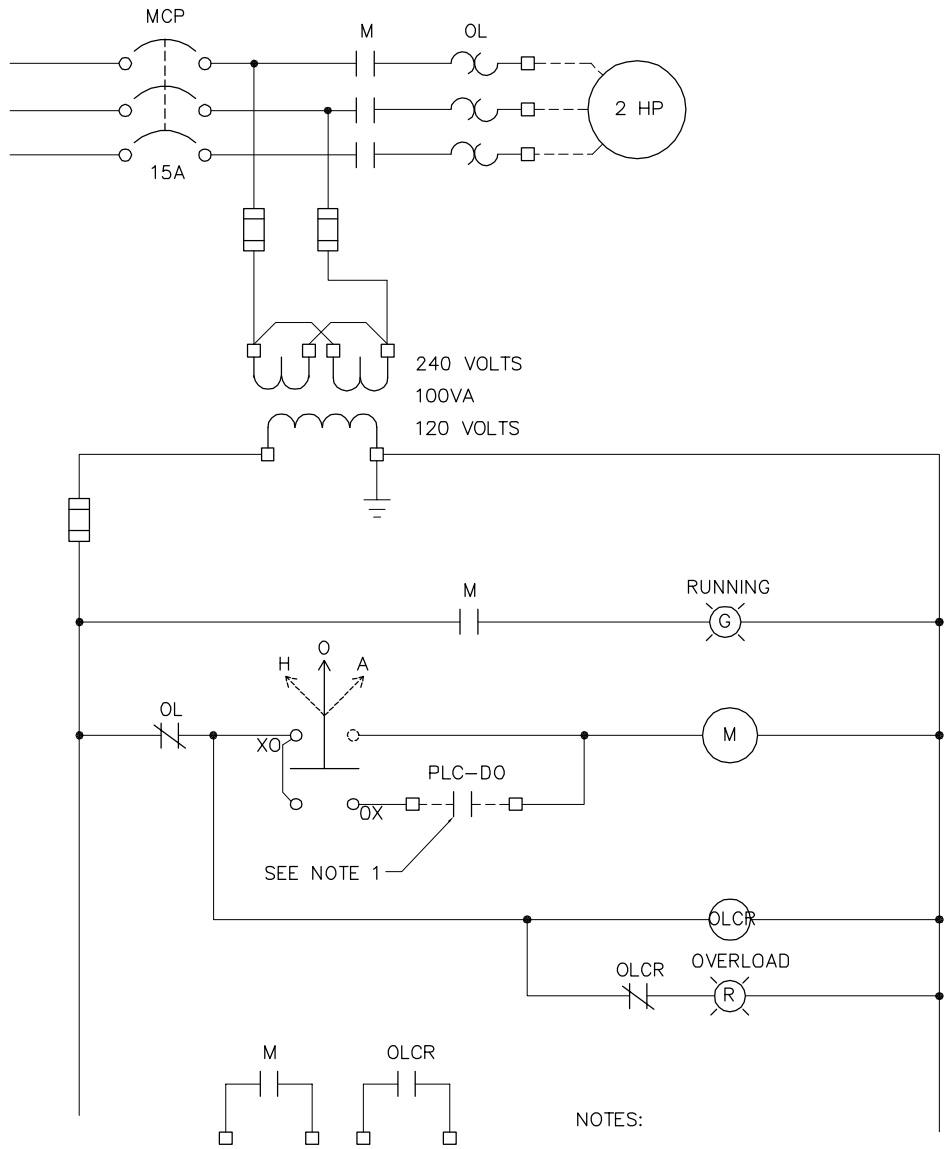
FORMER AMERICAN BERYLLIUM COMPANY SITE • TALLEVAST, FLORIDA
CONSTRUCTION DRAWINGS

ELECTRICAL LAYOUT

GENERAL

ARCADIS Project No. B0038055.0002.00010
Date SEPTEMBER 2008
ARCADIS
3350 BUSCHWOOD PARK DR.
SUITE 100
TAMPA, FLORIDA 33618
(813) 933-0697

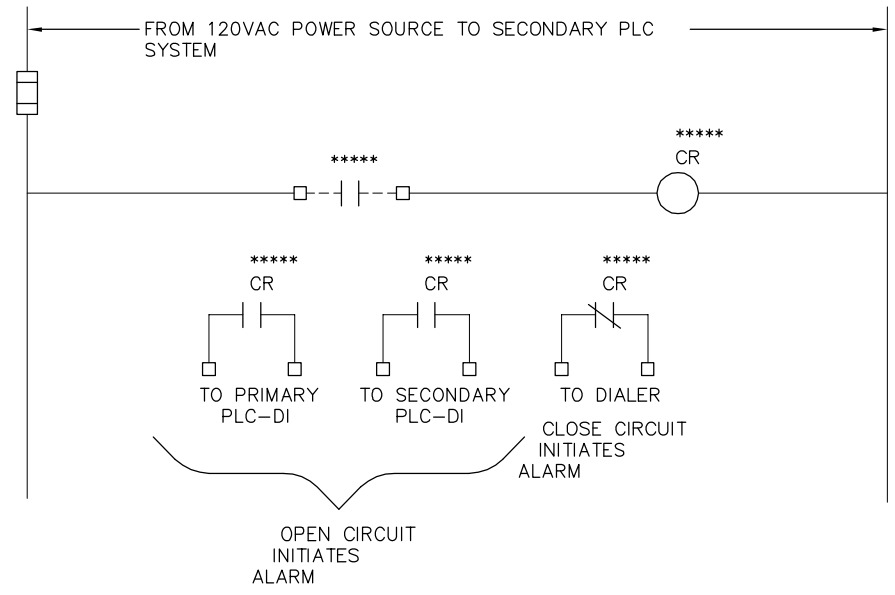
E-1



NOTES:

1. START CONTACT FROM PRIMARY PLC. CLOSES ON LEVEL SETPOINT IN TANK T–400. P–400 WILL SHUT DOWN WHEN P–201 SHUTS DOWN.
2. TO RELAY IN SECONDARY PLC ENCLOSURE. ALL LOGIC TO THE SECONDARY PLC SYSTEM IS 'FAIL SAFE', AN OPEN CIRCUIT CAUSES AN ALARM.

AERATION SYSTEM PUMP P–400



TYPICAL FOR ALL SECONDARY PLC INPUTS

ELECTRICAL SPECIFICATIONS

1. INSTALL TWO NEW THERMAL–MAGNETIC 15A, 3 POLE BREAKERS IN THE EXISTING 240 VOLT, 3 PHASE MAIN DISTRIBUTION PANEL. THE BREAKERS SHALL BE OF THE SAME MANUFACTURE AS THE EXISTING BREAKERS AND SHALL HAVE THE SAME INTERRUPTING RATING AS THE EXISTING BREAKERS. ONE BREAKER SHALL BE LABELED 'AERATION PUMP P–400' AND THE OTHER BREAKER SHALL BE LABELED 'AERATION SYSTEM COMPRESSOR AC–601'.

   INSTALL ONE 15 AMP SINGLE POLE BREAKER IN THE 120/208 VOLT LOAD CENTER TO SUPPLY POWER TO THE SECONDARY PLC SYSTEM. THE BREAKERS SHALL BE OF THE SAME MANUFACTURE AS THE EXISTING BREAKERS AND SHALL HAVE THE SAME INTERRUPTING RATING AS THE EXISTING BREAKERS. THE BREAKER LABEL SHALL BE 'SECONDARY PLC SYSTEM'.

2. CONDUIT – ALL CONDUIT SHALL BE HOT DIPPED GALVANIZED STEEL (RGS). ALL FLEXIBLE CONDUIT SHALL BE LIQUID TIGHT METAL FLEXIBLE (LTMF) CONDUIT UL LISTED AS GROUND CONDUCTING. ALL FITTINGS SHALL BE THREADED TYPE. LTMF CONDUIT SHALL BE NOT GREATER THAT 24" AND NOT LESS THAN 9" IN LENGTH. CONDUIT IN GRADE SHALL BE PVC SCHEDULE 80. PVC CONDUIT SHALL CONVERT TO RGS NOT LESS THAN 2" ABOVE FINISHED GRADE AND NOT MORE THAN 6" ABOVE FINISHED GRADE. ALL METAL CONDUIT CONNECTIONS SHALL BE MADE USING A LIBERAL COATING OF A CONDUCTIVE SEALANT SUCH AS T&B'S KOPR SHIELD. THE CONDUCTIVE SEALANT SHALL BE UL APPROVED FOR ELECTRICAL CONDUIT USE. ALL JUNCTION AND PULL BOXES BELOW 30" ABOVE FINISHED FLOOR (AFF) INDOORS AND ALL BOXES OUTDOORS SHALL BE NEMA 4 METALLIC. CONDUIT SHALL BE SPACED A MINIMUM OF $\frac{1}{4}$" FROM ANY SURFACE. ALL CHANNEL FOR CONDUIT SPACING, CONDUIT SUPPORT, TRAPEZE SYSTEMS, EQUIPMENT MOUNTING, ETC. SHALL BE HOT DIPPED GALVANIZED STEEL WITH A MINIMUM 1.5 OUNCES PER SQUARE FOOT PER SIDE AS PER ASTM A123. THE HANGER RODS FOR THE TRAPEZE SHALL BE $\frac{5}{8}$" DIAMETER 316 SS ALL THREAD ROD. MOUNTING HARDWARE SUCH AS BEAM CLAMPS, ETC. SHALL BE EITHER HOT DIPPED GALVANIZED STEEL TO THE COATING SPEC ABOVE OR 316 SS. ALL BOLTS, NUTS, WASHERS, CHANNEL SPRINGS, ETC. SHALL BE 316 SS.

3. WIRING – WIRING SHALL BE STRANDED XHHW EXCEPT SIGNAL CABLE. SIGNAL CABLE SHALL BE TWISTED SHIELDED #18AWG. THE SHIELD SHALL BE 100% FOIL TYPE WITH DRAIN WIRE. SIGNAL WIRING SHALL NOT BE SPLICED. AT ITS TERMINI, A GIVEN SIGNAL CABLE SHALL WIRED TO 3 CONSECUTIVE TERMINALS (+, –, DRAIN) IN ORDER TO KEEP THE STRIPPING OF THE OUTER INSULATION AND SHIELD TO A MINIMUM. SPLICING OF CONTROL AND POWER WIRING, WHERE NECESSARY, SHALL BE DONE VIA TERMINALS IN A JUNCTION BOX WITH A BACK PANEL TO MOUNT THE TERMINALS. WIRE NUT SPLICES ARE NOT ACCEPTABLE.

4. THE SECONDARY PLC SYSTEM SHALL BE MOUNTED WITHIN A NEMA 12 METALLIC ENCLOSURE. THE ENCLOSURE SHALL BE SUPPLIED WITH AN INTERNAL MOUNTING PANEL. THE ENCLOSURE SHALL BE OF SUFFICIENT SIZE TO HOUSE THE SECONDARY PLC RACK AND ALL ITS COMPONENTS; THE 3 POLE RELAYS; TERMINALS FOR ALL FIELD WIRING, ETC. THE ENCLOSURE SHALL ALSO CONTAIN A UPS CAPABLE OF PROVIDING 2 HOURS OF OPERATING TIME AT MAXIMUM LOAD. EVERY THING WITHIN THE ENCLOSURE AND POWER BY THE LIGHTING PANEL CIRCUIT FOR THE SECONDARY PLC SYSTEM SHALL BE CONSIDERED THE LOAD FOR THE UPS. THE SECONDARY PLC SHALL NOT BE CONNECTED TO ANY REMOTE VIEWING, PROGRAMMING OR REMOTE SET POINT DEVICE. EACH SECONDARY PLC DIGITAL OUTPUT POINT SHALL BE ISOLATED, RELAY OUTPUT TYPE. THE PLC I/O SHALL HAVE A MNINIMUM OF 25% SPARES AND SHALL BE EXPANDABLE BEYOND THE SPARES.

5. SUBMIT SHOP DRAWINGS FOR ALL EQUIPMENT, CONDUIT, WIRE, ETC. FOR ENGINEER'S APPROVAL.

CITY: DIV/GROUP: DB: LD: PIC: PM: TM: LYR:ON=*;OFF=*REF*
C:\Documents and Settings\mseppanen\Desktop\Tallevast\Phase 1_Aeration Sys Design\E-2.dwg LAYOUT: E-2 SAVED: 9/19/2008 10:37 AM ACADVER: 17.0S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: BLACKGRAY.CTB PLOTTED: 9/19/2008 10:37 AM BY: SEPPANEN, MAIJA
XREFS: IMAGES: PROJECTNAME: ----
3805X00

1/4"=1'–0" (4' 0 4' 8')

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

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Professional Engineer's Name: THEODORE M. COGSWELL
Professional Engineer's No.: 64401
State: FL | Date Signed: | Project Mgr.: DS
Designed by: MEC | Drawn by: MEC | Checked by: JB

ARCADIS
ARCADIS U.S., INC.
FLORIDA CERTIFICATE OF AUTHORIZATION NUMBER 7917

FORMER AMERICAN BERYLLIUM COMPANY SITE • TALLEVAST, FLORIDA
CONSTRUCTION DRAWINGS

ELECTRICAL DETAILS

GENERAL

ARCADIS Project No. B0038055.0002.00010
Date SEPTEMBER 2008

ARCADIS
3350 BUSCHWOOD PARK DR.
SUITE 100
TAMPA, FLORIDA 33618
(813) 933-0697

E-2

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Attachment 2

Headloss Calculations

PROCESS PUMP DESIGN CALCULATIONS - P-400

Total Dynamic Head Calculation

Former ABC Interim System

Tallevast, Florida

Total dynamic head calculation =
- headloss due to elevation change
- headloss due to pipe friction
- headloss across misc. process components
- required discharge head

Calc prepared by: J. Bedessem
Calc checked by: M. Seppanen
Date: 09/10/08

Calculate head loss (h_e) due to elevation change:

assume:	Height from pump to discharge point =	12	feet
	Head loss, h_e =	12	feet

Calculate headloss due to pipe friction losses:

Step 1. There is one pipe section with flow and pipe diameters shown below

Pipe Section 1	Nominal pipe diameter $_1$ =	1	inch
	Flow (v_1) =	15	gpm

Step 2. Calculate the friction factor for each pipe section using the Hazen-Williams formula

Hazen-Williams Formula

$$f = .2083 * (100/C)^{1.852} * (q^{1.852}) / (D^{4.8655})$$

- f = Friction in head in feet of water per 100 ft of pipe
- C = Constant for inside roughness (150 for new Stainless Steel pipe, 130 for pipe with some scaling)
- q = Flow rate (gal/min)
- D = Inside diameter of pipe (inches)

Friction factor for Pipe Section 1

C = Pipe roughness factor	130	unitless
q = flow rate (gal/min)	15	gal/min
D_1 = Inner pipe diameter (inches)	0.924	inches (see NOTE)
Pipe Section 1 friction factor	28.4	ft water / 100 feet of pipe

NOTE: a 0.0625 inch (1/16 inch) deposition on interior pipe wall is included in diameter for calculation - 1.049 - (2 x 0.0625) = 0.924 inch diameter

Step 3. Calculate the equivalent length of pipe for each section

Pipe Section 1 (1-inch diameter)

Item	Qty.	L (ft)	Qty * L
Linear Pipe (L_1)	1	55	55
		Equivalent Length	
90• Elbows	14	2.62	36.68
Standard Tee (thru flow)	1	1.75	1.75
Standard Tee (branch flow)	3	5.25	15.75
Ball valve (full open)	2	5	10
Check valve - spring	0	8.74	0
Other	0	0	0
		Total Equivalent Length:	**120**

Step 4. Determine pipe friction for each pipe section.

total pipe friction = total equivalent length x friction factor

Total Pipe Friction - Pipe Section 1

total equivalent length	120	feet
friction factor	28.4	feet water / 100 feet of pipe
Total Pipe Friction - Pipe Section 1	34.0	feet

PROCESS PUMP DESIGN CALCULATIONS - P-400
Total Dynamic Head Calculation
Former ABC Interim System
Tallevast, Florida

Step 5. Determine total pipe friction (all sections)

Total Pipe Friction - Pipe Section 1	34.0	
Total Pipe Friction	34.0	

Calculate Total Dynamic Head:

Head Loss Due to Change in Elevation	12	ft	
Headloss due to pipe friction	34	ft	
Headloss Across Misc. Process Components			
Aeration Fitting	23	ft	1 psi = 2.31 ft
		ft	
		ft	
		ft	
Required Discharge Pressure (5 psi)	12	ft	
Total Dynamic Head Required - Calculated	**81**	ft	
Design Safety Factor	**25%**		
Total Dynamic Head Required - Design	**101**	**feet**	

Pump Design Requirements:

Flow	**15**	gpm
Total Dynamic Head	**101**	feet
Velocity	**7.18**	ft/sec

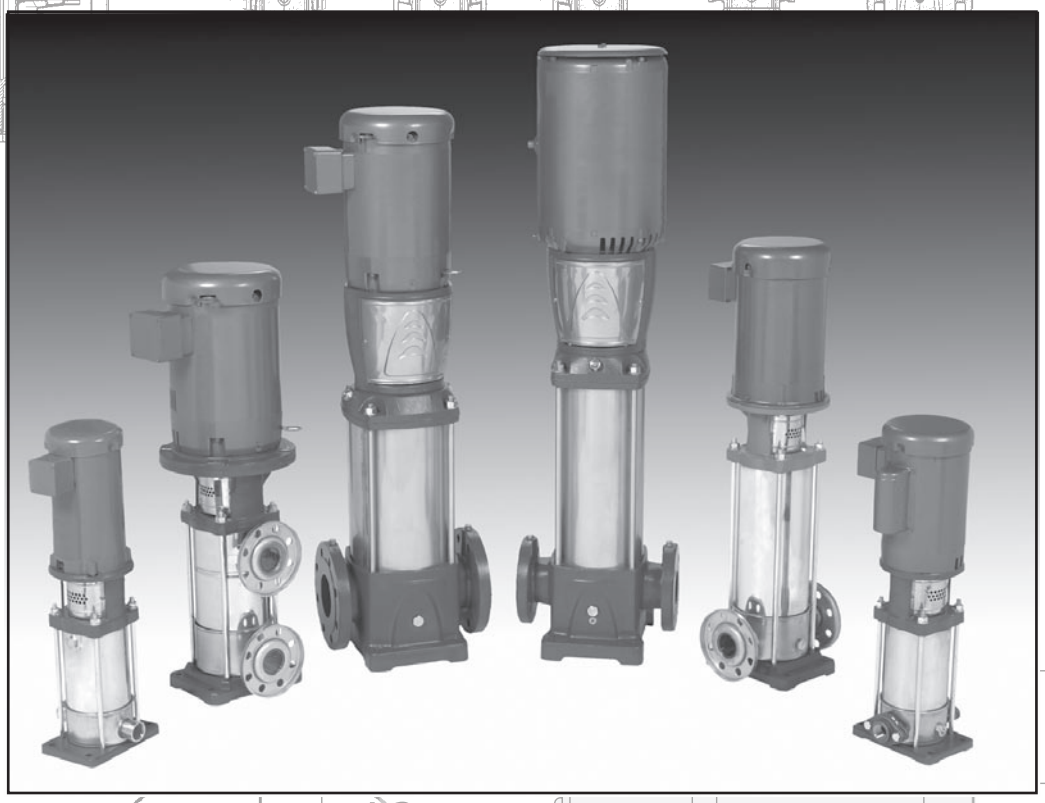
Inputs
Formulas or Constant

ARCADIS

Attachment 3

Equipment Catalogue Sheets

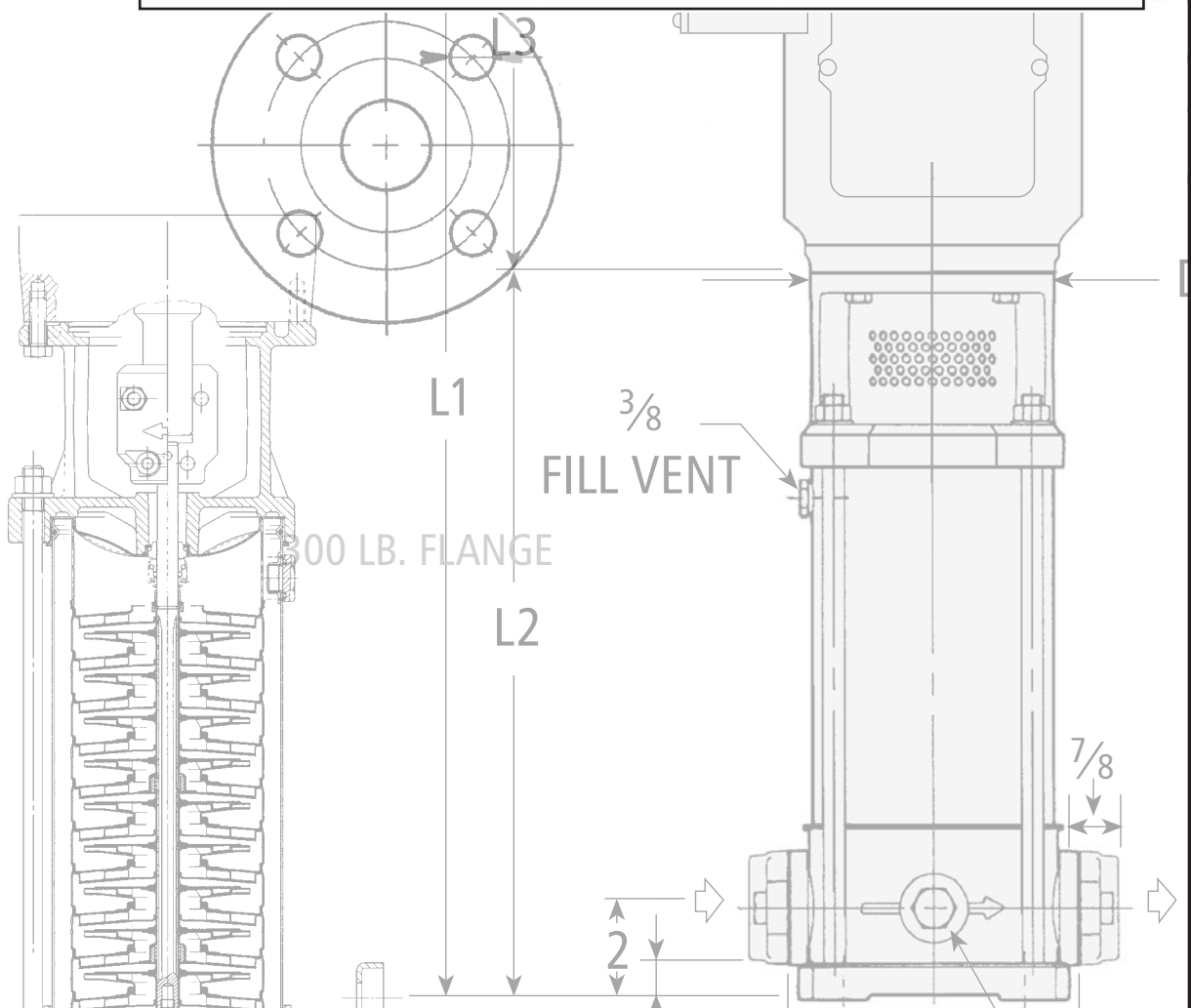
GOULDS PUMPS



G&L Series SSV

TECHNICAL MANUAL

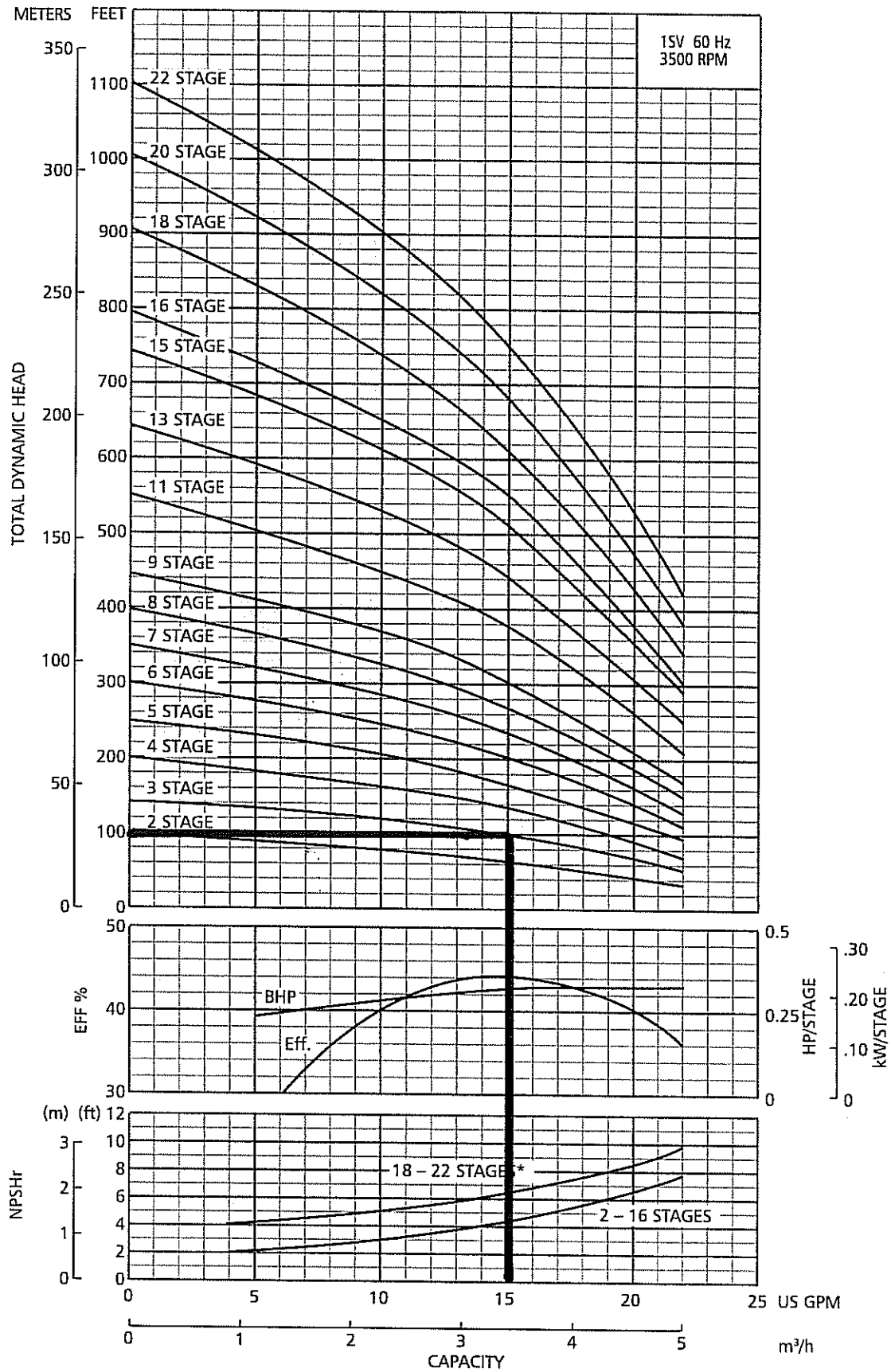
SSV Series Vertical Multi-Stage Pumps



Goulds Pumps

ITT Industries

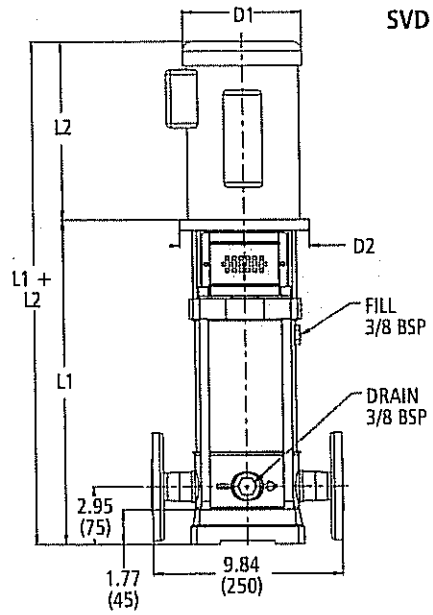
1SV Curve 3500 RPM

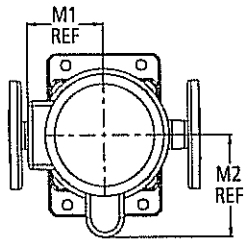


* For vertical shaft installation only.

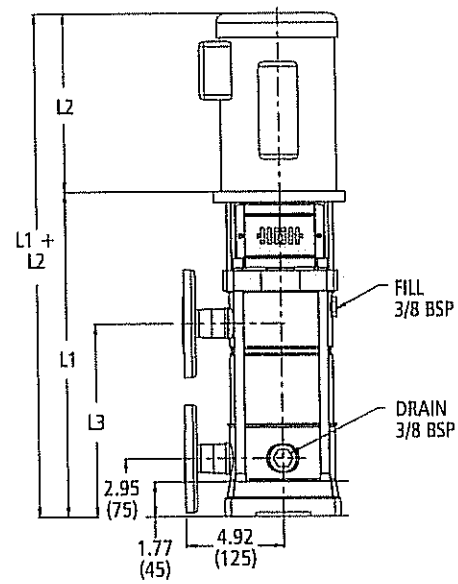
Dimensions and Weights
1SV Series 3500 RPM

SVB
SVD

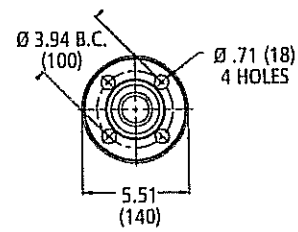




SVC

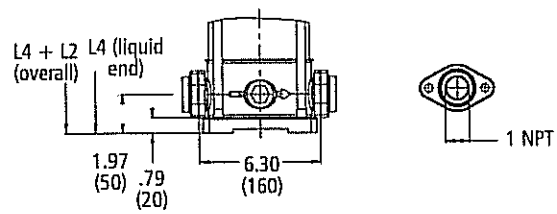


FLANGE

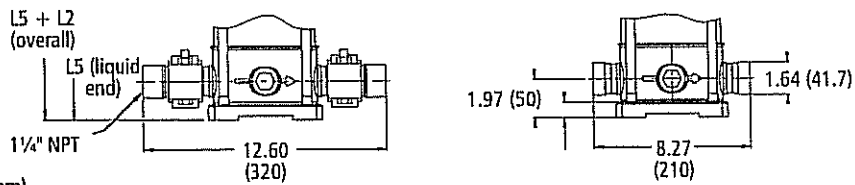


1¼" CLASS 300

SVA



VICTAULIC



All dimensions are in inches (mm).

Stage	Frame (1-Phase)		Frame (3-Phase)				L2							D1 (max.)		Weights (lb)		
	ODP	TEFC	ODP	TEFC	HP	L1	ODP	TEFC	L3	L4	L5	M1 (ref.)	M2 (ref.)	ODP	TEFC	Liquid End	ODP	TEFC
2	56C		56C		½	12.69	9.16	9.29		11.69	11.69	5.06	5.19	6.19	6.19	21	22	22
3					¾	13.63	10.79	9.91		12.69	12.69					22	24	28
4					1	14.63	10.66	11.19		13.63	13.63	5.73	5.55		7.19	23	32	40
5					1½	15.63	10.67		8.88	14.63	14.63					25	40	43
6					2	16.63	11.19	12.06	9.88	15.63	15.63			7.19		27	43	51
7						17.56	11.19		10.81	16.63	16.63					28		
8					3	18.56	11.57	13.44	11.81	17.56	17.56		5.50	7.16		29	51	56
9						19.56			12.81	18.56	18.56					30		
11						20.50			14.75	20.50	20.50					33		
13	182-4TC		182-4TC		5	23.50	13.93	15.43	16.75		22.50	6.87	6.62	8.50	8.50	35	75	85
15						25.44			18.69		24.44					37		
16						26.44			19.69		25.81					39		
18						28.44					27.50					41		
20	213TC		213TC		7½	30.44					29.50					44	101	124
22						32.44					31.50					46		

SSV Product Line
Numbering System for 1 – 4SV

The various versions of the SSV line are identified by a product code number on the pump label. This number is also the catalog number for the pump. The meaning of each digit in the product code number is shown below.
Note: Not all combinations are possible. Consult your G&L distributor.

Example Product Code

2 SV A 1 D 2 B 1 H

Options: H = Horizontal mount, **refer to back cover**
VIC = Victaulic connections **(1SVB/D – 4SVB/D only)**

Mechanical Seal Options:

Code No.	Rotary	Stationary	Elastomer	Reference Application
0	High Temp. Carbon	Silicon Carbide Graphite Filled	Viton	General Service
4	Silicon Carbide Graphite Filled			Abrasive
6	High Temp. Carbon		EPR	Boiler Feed

Number of Stages:
B = 2 D = 4 F = 6 H = 8 K = 10 M = 12 P = 14 R = 16 V = 20 Z = 24
C = 3 E = 5 G = 7 J = 9 L = 11 N = 13 Q = 15 T = 18 X = 22

Driver: (50 Hz, no single phase number 0, 1, 4)
1 = 1 PH, ODP 3 = 575V, ODP 5 = 3 PH, TEFC 7 = 3 PH, XP 9 = 3 PH, TEFC with premium efficiency
2 = 3 PH, ODP 4 = 1 PH, TEFC 6 = 575V, TEFC 8 = 575V, XP 0 = 1 PH, XP

HP Rating: C = ½ F = 1 G = 2 J = 5 L = 10 N = 20
D = ¾ F = 1½ H = 3 K = 7½ M = 15 P = 25

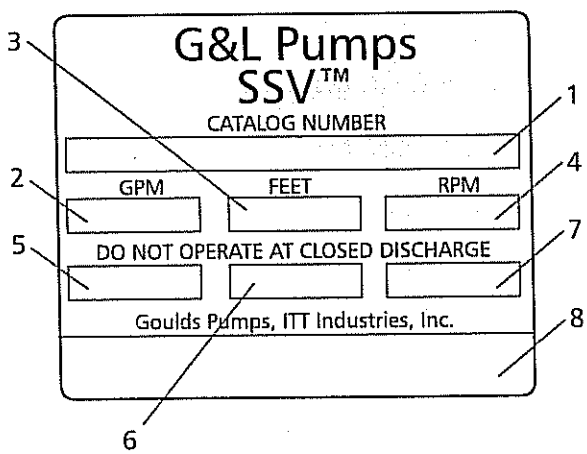
Hertz/RPM: 1 = 60 Hz, 3500 RPM 3 = 60 Hz, 3500 RPM, 380 V 5 = 60 Hz, 3500 RPM, 220-380 V, D.O.L.
2 = 50 Hz, 2900 RPM, 190-380 V, (50 Hz motor) 4 = 50 Hz, 2900 RPM, 460 V 6 = 60 Hz, 3500 RPM, 380 V, Y-DELTA

Material and Suction/Discharge:
A = 304 stainless steel, in-line NPT threaded oval flange connections (1, 2, 3 only)
B = 304 stainless steel, in-line ANSI flange (1, 2, 3, 4SV)
C = 304 stainless steel, top/bottom ANSI flange connections
D = 316 stainless steel, in-line ANSI flange

Product Line: Stainless Vertical

Nominal Flow: 1 = 15 GPM 2 = 28 GPM 3 = 55 GPM
4 = 86 GPM

Rating Plate 1, 2, 3 and 4SV



1	Goulds Catalog Number
2	Capacity Range
3	TDH Range
4	Rated Speed
5	Rated Horsepower
6	Maximum Operating Pressure
7	Maximum Operating Temperature
8	Pump Serial Number

SSVD 316SS
Vertical Multi-stage

Submittal Data

Hydraulic Data					Motor Data	SSV Veritcal	Qty.
Maximum Flow	Flow at Duty Point	Maximum TDH	TDH at Duty Point	$NPSH_R$	Voltage / Phase / Enclosure	Model	
22 US g.p.m.	15 US g.p.m.	141 ft	98 ft	4 ft	460V 3PH TEFC		1

Submittal Prepared for: _____ Job: _____
Engineer: _____ Contractor: _____
Submittal Prepared by: _____ Company: _____
Submittal Date: 2008-09-15 Approved by: _____ Date: _____

Engineering Data

Pump Code:1SVD1D5C0
Pump Size: 15 GPM
Pump Max Horsepower: 0.8662 hp
Pump Horsepower at Rating Point: 0.84 hp
Pump Shut Off Head: 141 ft
Motor Speed: 3450 rpm
Max. Temperature: 250 °F
Liquid: Water
Motor Code: V05742
System Input Power: 3~ 460 V
Motor Rated Horsepower: 0.75 hp
Max. Frequency60
Electrical Enclosures:TEFC
Motor Standard:NEMA
Suction Flange Standard:ANSI
Suction Flange Rating: Class 300
Suction Size: 1 1/4"
Discharge Flange StandardANSI
Discharge Flange Rating:Class 300
Discharge:1 1/4"
Approximate Net Weight: 43 lb
Impeller Size:"
Impeller Construction: Closed
Impeller Type: Radial impeller
Impeller Material:
316 Stainless Steel
Sense of Rotation:Clockwise from the drive end
Shaft Seal: High Duty Carbon/ Graphatized ...

Standard Equipment / Capability:

PUMP
The SSV pump is a non-self priming vertical multistage pump coupled to a standard motor. The liquid end, located between the upper cover and the pump casing, is held in place by tie rods. The pump casing is available with different configurations and connection types.
• Delivery: up to 600 GPM • Head: up to 1200 feet
• Temperature of pumped liquid: -20°F to 250°F (-30°C to 120°C) standard version
• Maximum operating pressure
– Normal stack (CW rotation) with oval flanges: 230 PSI (15 bar)
– Normal stack (CW rotation) with round flanges or Victaulic: 360 PSI (25 bar)
– Reverse stack (CCW rotation) with round flanges or Victaulic: 580 PSI (40 bar)
– SV33, 46: 230, 360 or 580 PSI (16, 25 or 40 bar)*
– SV 66, 92: 230 or 360 PSI (16 or 25 bar)*
• Direction of rotation: clockwise looking at the pump from the top down (marked with an srrow on the adapter and on the coupling).
MOTOR
• Standard NEMA TC Frame motors in open drip proof or totally enclosed fan cooled.
• 3500 RPM nominal
• Standard voltage:
• Single phase version: 115-208/230 V, 60 Hz up to 3 HP or 208-230 V for 5 HP
• Three phase version, 2 pole: 208-230/460 V, 60 Hz up 75 HP
* Based on pump staging 1SV, 2SV, 3SV, 4SV Series
• Vertical multistage centrifugal pump. All metal parts in contact with the pumped liquid are made of stainless steel.
• The following versions are available:
B – ANSI flanges, in-line delivery and suction ports, AISI 304
A – Oval flanges (NPT), in-line delivery and suction ports, AISI 304
C – ANSI flanges, delivery port above the suction port, with four adjustable positions, AISI 304
D – ANSI flanges, in-line delivery and suction ports, AISI 316
VIC – Victaulic couplings, in-line delivery and suction ports, AISI 316
• Reduced axial thrusts enable the use of standard NEMA TC motors that are easily found in the market
• Seal housing chamber designed to prevent the accumulation of air in the critical area next to the mechanical seal
• Mechanical seal according to EN 12756 (ex DIN 24960) and ISO 3069
• Versions with ANSI flanges that can be coupled to ANSI raised face counter-flanges
• Threaded oval counter-flanges made of stainless steel are standard supply for the A versions
• Easy maintenance. No special tools required for assembly or disassembly
• Standard version for temperatures ranging from:
-20°F to 250°F (30°C to 120°C)

PULSAR

IMP

ULTRASONIC LEVEL - Simple, Yet Powerful!

PULSAR

IMP

IMP benefits

Quick Startup

No Electrical Noise Problem

3˚ Effective Beam Angle

Low Cost

Smart Echo Processing

Mapping using IMP PC Software

Self-contained non-contacting ultrasonic level measurement with digital echo processing for superb performance.

- Compact low profile self-contained intelligent level measurement
- Calibrate without compromising IP rating
- Small 1.5" NPT thread (2" on 10m version)
- Simple menu led set-up
- High acoustic power with narrow beam angles
- 5 inch deadband on 3m version
- Agitator avoidance as standard

IMP variants

	Range	2 / 3-wire configurable IMP	2-wire I.S. IMP
IMP 3	0.4 - 10 feet	4-20 mA & 0-10 Vdc output 11-30 volts dc 4-key user interface LCD adjustable backlit display Temperature compensation 2 alarm relays, 1A 30V (3-wire) IMP PC Software	Intrinsically Safe certificate to ATEX EExia IIC T6 4-20mA loop powered ONLY 4-key user interface LCD display Temperature compensation IMP PC Software
IMP 6	1 - 20 feet		
IMP 10	1 - 33 feet		

IMP applications

You can use IMP wherever you need reliable non-contacting level measurement. It works great in liquid, slurry or basic solids application.

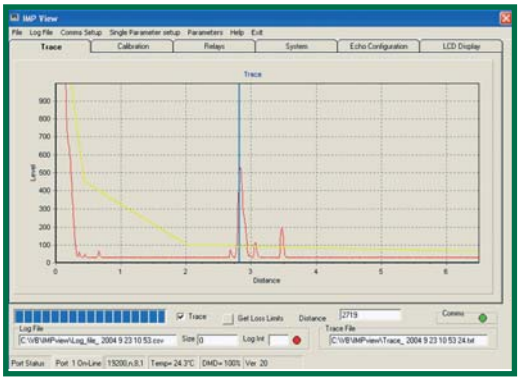
sIMPle to install

The IMP is compact and can be simply screwed into a 1.5" or 2" NPT fitting. High transducer power and tight beam angles together with Pulsar's digital echo processing, makes IMP ideal for many "difficult" applications where a tank has unavoidable obstructions. The integral display makes programming the IMP extremely straight forward. The IMP can be completely set up however you choose, either using the integral keypad on the unit itself, or with the optional IMP PC software.

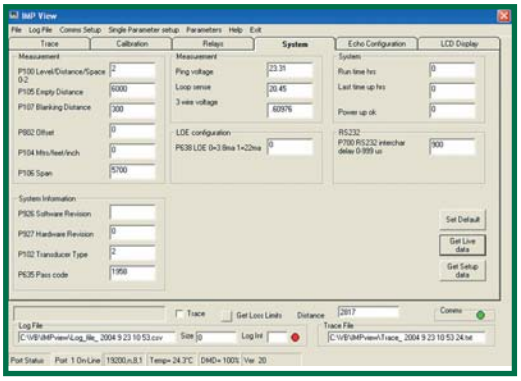
IMP PC Software

IMP PC is optional software that extends the IMP's capabilities, allowing you to:

- **Download, analyze and store echo profiles**. *A great way to see exactly what is happening in the application. Fine tuning for ultimate performance.*
- **Set-up** the IMP**.** *All programming parameters are instantly visible in the IMP PC programming screens. Program the IMP unit on a desktop before installation, or clone a number of IMPs to save valuable time.*
- **Updates**. *Future-proof your IMP! Pulsar's policy of continuous improvement means that we never stop developing our products. The IMP PC software allows new firmware to be installed into your IMP units without even removing them from the application.*
- **Flow measurement.** *A flow curve may be added within IMP PC to configure for simple level to flow linearization*



IMP echo trace



IMP programming screen

Part of the family

The IMP is just one member of the Pulsar range of level and flow measurement equipment:

BLACK BOX	Low cost level system with 2 relays
ULTRA 3	Level, volume, basic pump control and open channel flow with 3 relays
ULTRA 5	Level, volume, differential control, advanced pump control and open channel flow with 5 relays
ZENITH	The ultimate level and pump controller with 6 relays, 7 digital inputs, RS485 modules and more...

www.pulsar-us.com

Technical Specifications

Physical:	Dimensions:	6.9 inches overall height x 5.12 inches diameter
	Cable entry:	2 off cable glands 4.5 - 10mm
	Mounting:	1.5" NPT (3m and 6m range versions), 2" NPT (10m version)
	Weight:	approximately 2 lbs
	Wetted Material:	PBT (Valox 357) with Syntactic Hard Foam Optional PVDF (pending)
Environmental:	Temp range (process):	-40°F to 167°F
	Temp range (ambient):	-40°F to 180°F
	IP Rating:	NEMA 4x (IP65)

Variants:	**IMP 3**	**IMP 6**	**IMP 10**
Beam angle (-3dB half power)	10° inclusive	10° inclusive	10° inclusive
Effective Beam angle	3° inclusive	3° inclusive	3° inclusive
Operating frequency	125kHz	75kHz	41kHz
Measurement range	0.125m-3m 0.5 - 10 ft	0.3m-6m 1 - 20 ft	0.3m-10m 1 - 33 ft

Performance:	Digital echo processing	
	Input voltage range:	11-30V (17-30V for IS version), 3.8-22mA
	Accuracy:	± 0.25% or 6mm (whichever is greater)
	4-20mA output:	resolution 5µA
	Temperature compensation:	via internal temperature sensor (±0.5°C accuracy)
	Level and volume conversion are installed allowing linearization for tank shapes	

IMP may be wired as either a 2-wire or 3-wire, giving the features below:

2-wire configuration:	RS232 (RJ11 port) connection for diagnostics and software updates	
	4 digit LCD display	
	4 button keypad for parameter entry	
	Power consumption:	3.8 - 22mA
3-wire configuration: (additional to 2-wire)	Backlit LCD display	**Part #'s: IMP 80 - 3, IMP 80 - 6, IMP 80 - 10**
	0-10V analog output	
	2 relays:	single pole two way, 1A 30VDC/AC
	Power consumption with relays energized <60mA (less12mA/relay not energized)	
2-wire IS version:	Intrinsically Safe to ATEX EExia IIC T6	**Part #'s: IMP 81 - 3, IMP 81 - 6, IMP 81 - 10**
PC Interface IMP PC:	All parameters can be accessed and changed through IMP PC software. Echo traces may be viewed on screen.	

Contact us

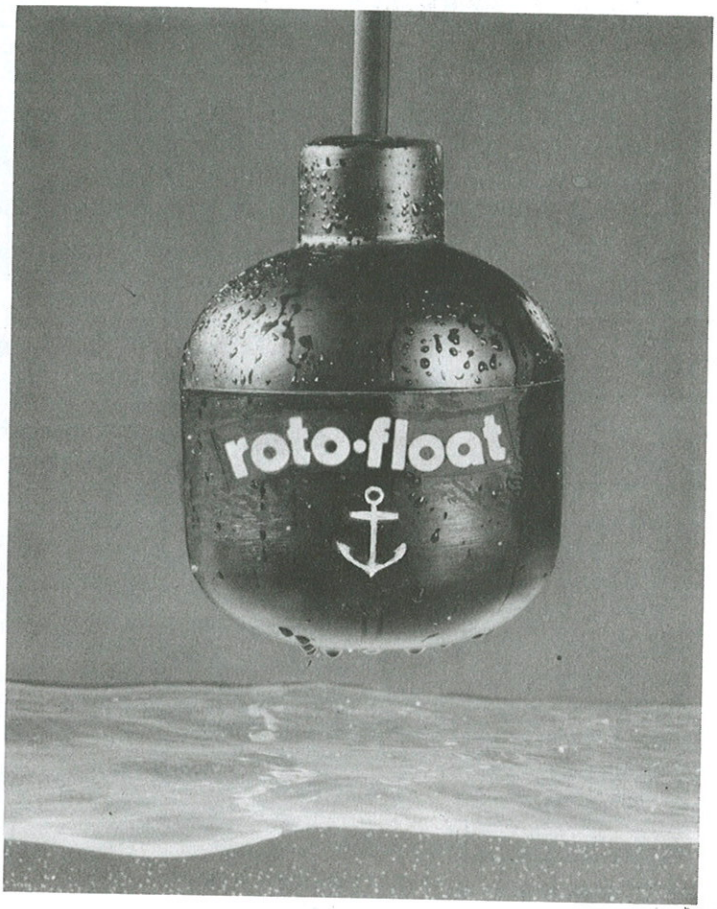
Pulsar Inc
PO Box 799, Shalimar, Florida 32579, USA
Tel: 1 850 609 1777, Fax: 1 850 651 4777
e-mail: info@pulsar-us.com, website: **www.pulsar-us.com**

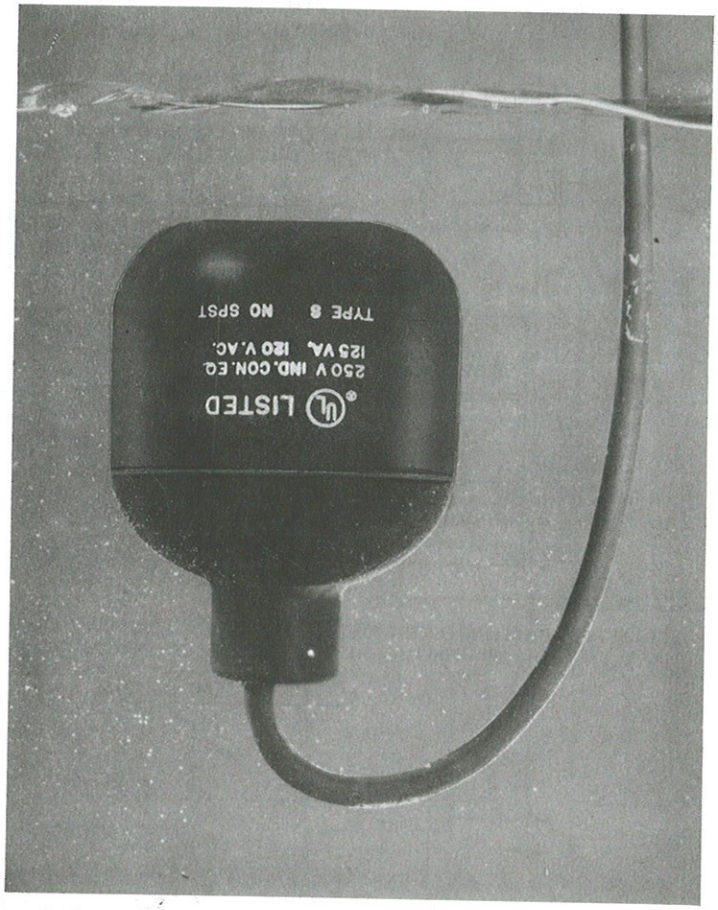
Certificate No: 950136
Literature: IMP1 Feb 05

anchor scientific inc.
Box 378, Long Lake, MN 55356
952-473-7115 • FAX 952-473-6002 • www.anchorscientific.com

roto-float
Type S - Suspended
Form 2700-B

TYPE S





The ROTO-FLOAT is a direct acting float switch. Each ROTO-FLOAT contains a single pole mercury switch which actuates when the longitudinal axis of the float is horizontal, and deactuates when the liquid level falls 1" below the actuation elevation.

The float is a chemical resistant polypropylene casing with a firmly bonded electrical cable protruding. One end of the cable is permanently connected to the enclosed mercury switch and the entire assembly is encapsulated to form a completely water tight and impact resistant unit. Type S — Suspended has built in weight.

ROTO-FLOATS can be mounted on a support pipe (type P) or suspended from above (type S). Advantages of the ROTO-FLOAT are low cost, simplicity and reliability.

UL Listed
- Pilot Duty
- Industrial Control Equipment

CABLE

P.V.C. type STO #18 conductors (41 strand) rated 600 volts • Various lengths available • See table of models • Non-standard lengths also available on special order.

Switch Arrangement	Cable Length	Suspended Type S Model No.	Ship. Wt.
Normally Open	20 30 40	S20NO S30NO S40NO	4# 4 1/2# 5 1/4#
Normally Closed	20 30 40	S20NC S30NC S40NC	4# 4 1/2# 5 1/4#

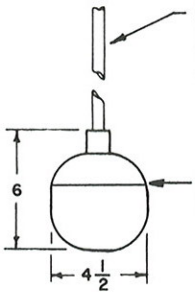
GENERAL DESCRIPTION:

THE ROTO–FLOAT IS A DIRECT ACTING FLOAT SWITCH. EACH ROTO–FLOAT CONTAINS A SINGLE POLE MERCURY SWITCH WHICH ACTUATES WHEN THE LONGITUDINAL AXIS OF THE FLOAT IS HORIZONTAL, AND DEACTUATES WHEN THE LIQUID FALLS 1" BELOW THE ACTUATION ELEVATION.

THE FLOAT IS A CHEMICAL RESISTANT POLPROPYLENE CASING WITH A FIRMLY BONDED ELECTRICAL CABLE PROTRUDING. ONE END OF THE CABLE IS PERMANENTLY CONNECTED TO THE GLASS ENCLOSED MERCURY SWITCH AND THE ENTIRE ASSEMBLY IS ENCAPSULATED TO FORM A COMPLETELY WATER TIGHT AND IMPACT RESISTANT UNIT.

ROTO–FLOATS CAN BE MOUNTED ON A SUPPORT PIPE, (TYPE P); OR SUSPENDED FROM ABOVE, (TYPE S). ADVANTAGES OF THE ROTO–FLOAT ARE LOW COST, SIMPLICITY AND RELIABILITY. VARIOUS CIRCUIT CONFIGURATIONS, OTHER THAN THE ONES LISTED BELOW, ARE AVAILABLE.

SPECIFICATIONS:



PVC TYPE STO, 2- #18 AWG 41 STRAND 600V, 60°C CONDUCTORS 20', 30', 40' LENGTHS STANDARD, OTHER LENGTHS AVAILABLE. UL & CSA LISTED.

POLYPROPYLENE CASING CONTAINS HERMETICALLY SEALED MERCURY SWITCH.

USE: N.O. FOR PUMP OUT
N.C. FOR PUMP IN

- UL LISTED, IND. CONT. EQ.
  PILOT DUTY
  4.5 AMPS 120 VAC
  2.25 AMPS 240 VAC
- FLOAT COLOR
  N.O., BLACK
  N.C., RED
- MOUNTING ARRANGEMENT
  TYPE P - PIPE MOUNTED MODEL INCLUDES POLYPROPYLENE CLAMP

  TYPE S - SUSPENDED MODEL WITH STABILIZING WEIGHT.

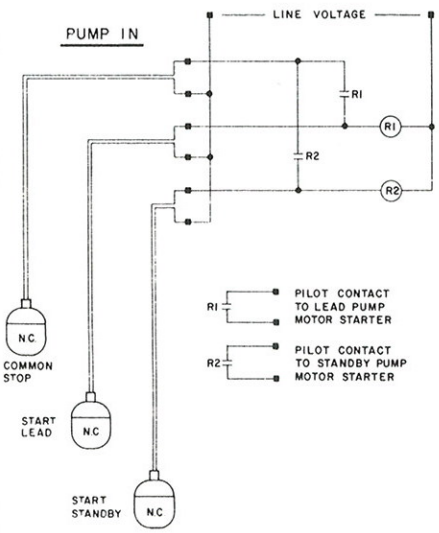
MODELS:

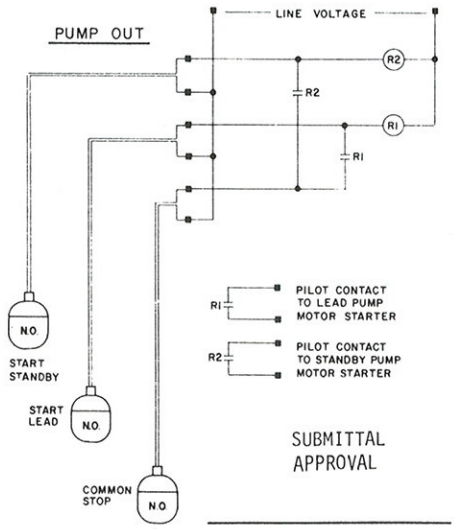
SWITCH ARRANGEMENT	CABLE LENGTH	SUSPENDED TYPE S		PIPE MOUNTED TYPE P	
		MODEL NO.	SHIP WT.	MODEL NO.	SHIP WT.
NORMALLY OPEN	20	S20NO	4#	P20NO	2#
	30	S30NO	4 ½#	P30NO	2 ¾#
	40	S40NO	5 ¼#	P40NO	3 ½#
NORMALLY CLOSED	20	S20NC	4#	P20NC	2#
	30	S30NC	4 ½#	P30NC	2 ¾#
	40	S40NC	5 ¼#	P40NC	3 ½#

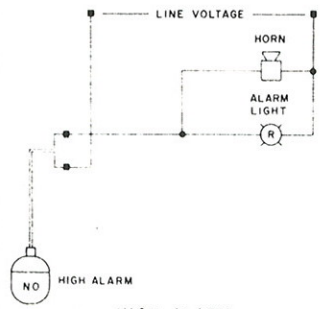
APPLICATIONS:

FOR USE IN CONTROLLING PUMPS OR OTHER MACHINES AND MEASURING ALARM LEVELS IN WATER, SEWAGE AND MANY OTHER LIQUIDS. ROTO–FLOATS MAY BE USED FOR PUMP IN OR PUMP OUT CONTROL, FOR LOW LEVEL CUTOUT, OR FOR LOW AND HIGH LEVEL ALARMS.

TYPICAL 2 PUMP CIRCUITS







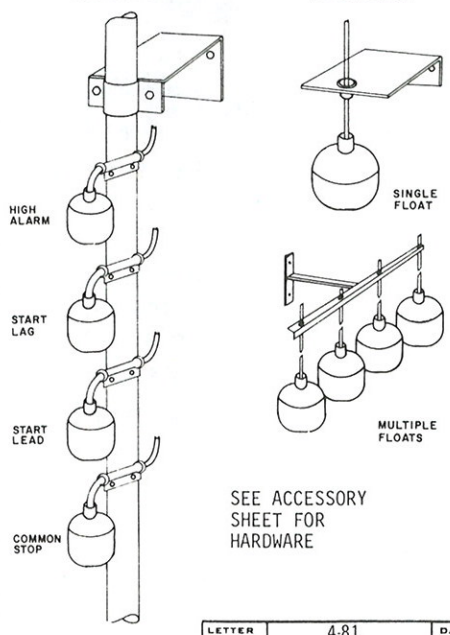
HIGH ALARM

SUBMITTAL APPROVAL

NAME

DATE

TYPICAL MOUNTING



SEE ACCESSORY SHEET FOR HARDWARE

Not For Use in Potable Water

IMPORTANT NOTE: Use in accordance with local electrical code and authority having jurisdiction. Do not use Roto-Floats in gasoline, volatiles or other combustibles.

This product contains mercury. Dispose of in accordance with Local, State and Federal Regulations so that mercury does not contaminate the environment.

LETTER	REVISIONS	DATE
A	4-81	

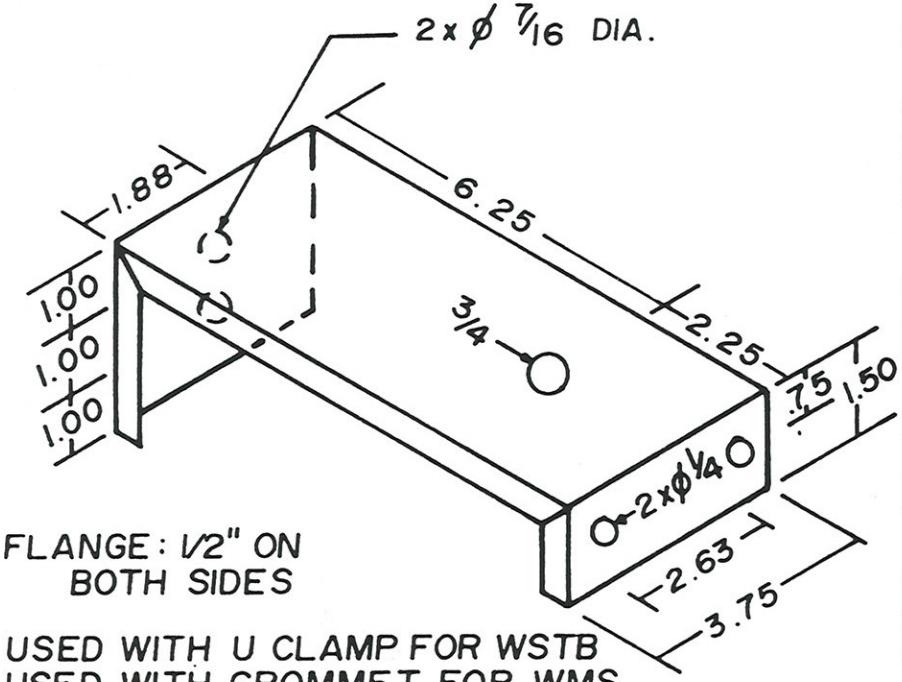
DWN BY: PD	DATE: 1-9-74	
CKD BY: JA	DATE: 1-9-74	
APPD BY: DS	DATE: 4-30-76	
PROJECT NAME: ROTO-FLOAT		
FACTORY ORDER NO.		

anchor scientific inc.
Box 378, Long Lake, MN 55356
952/473-7115

SPECIFICATION DATA SUBMITTAL AND INSTRUCTION SHEET

DWG. NO. 174 - 4

BASE BRACKET
WMS, WMP, WSTB, and S-4

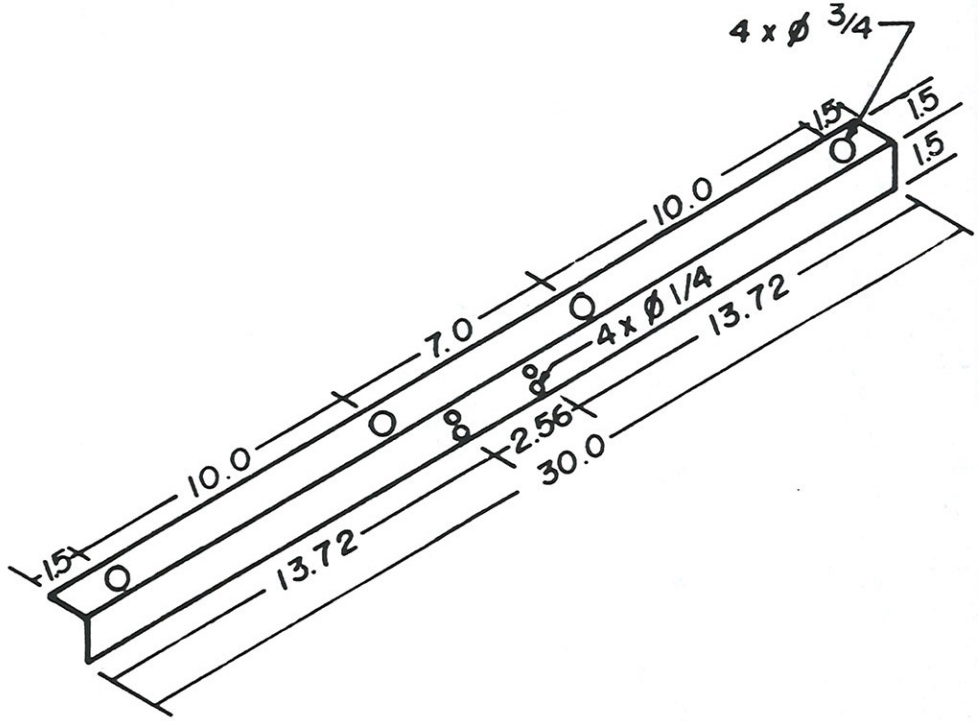


FLANGE: 1/2" ON BOTH SIDES

USED WITH U CLAMP FOR WSTB
USED WITH GROMMET FOR WMS
USED AS IS FOR WMP

16 GA.
316 SERIES
STAINLESS
STEEL

S-4 LONG BRACKET



USED WITH WMP TO FORM S-4 BRACKET
GROMMETS SUPPLIED

16 GA. 300 SERIES STAINLESS STEEL

ANCHOR SCIENTIFIC INC.
LONG LAKE, MN.

DRAWN BY CFCIII	DATE 8/13/85	REVISIONS	DATE
CHECKED BY JTP	8/13/85		
APPROVED BY JTP	8/13/85		
SCALE: 1:30, 1:60			

TITLE **BRACKET DIM.**
WMS, WMP, WSTB, and S-4

DRAWING NUMBER **9010-2**

VIBRATING LIQUID LEVEL SWITCH

RESONATOR™

Model RS80

www.ktekcorp.com

FEATURES:

- **Direct Replacement for Ultrasonic Gap Switches, RF Capacitance Switches, Float Switches and Other Technologies**
- **Immune to Low to Medium Coating or Build-Up on Sensor**
  - ⇒ **Temperatures between -40°F to 350°F (-40°C to 177°C)**
  - ⇒ **Pressures to 2000 psig (138 bar)**
  - ⇒ **Viscosity up to 20000 cP**
  - ⇒ **Density from 0.5 SG**
- **Robust Sensing Element**
- **Standard ¾" MNPT Process Connection**
- **Single Compartment Housing with Viewing Cover**
- **Field Selectable Parameters with External Magnet or Internal Pushbuttons (Fail Safe, Density)**
- **Modular Electronics with Alarm Status LED**
- **Continuous Self-Test Diagnostics**
- **Extended Probe Lengths to 120 in. (3048 mm)**

RS80 Shown with Standard Stainless Steel Probe Finish

BENEFITS:

- **No Mechanical Moving Parts**
- **Externally Visible Status LED**
- **Maintenance Free**
- **No Calibration**
- **Set It and Forget It**

APPLICATIONS:

- **Overfill Protection**
- **High and Low Level Alarm**
- **Oil Tank Farms**
- **Fine Chemicals**

SPECIFICATIONS

Mechanical

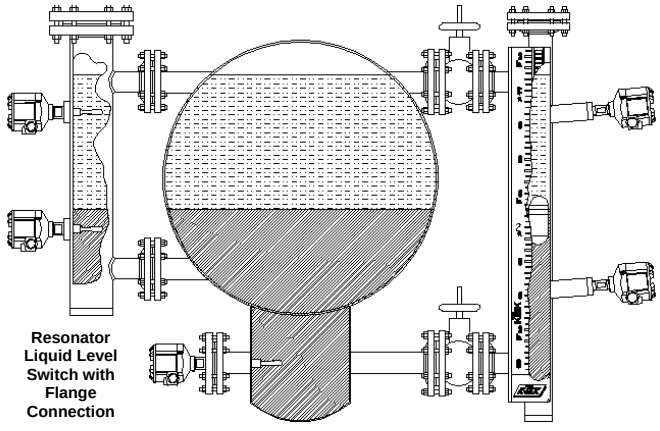
Housing Type	Single Compartment Powder Coated Aluminum with Glass Viewing Cover
Electronics Temperature	-40°F to 158°F (-40°C to 70°C)
Specific Gravity	Adjustable High or Low Specific Gravity Setpoint
Viscosity	Up to 20,000 cP
Process Temperature	-40°F to 350°F (-40°C to 177°C)
Process Pressure	0 to 2000psig (138 bar)
Process Connection	¾" NPT (standard)
Probe Length	3-3/8" (86mm) Standard to 120" (3048mm)

Approvals

Factory Mutual System	XP CL1, Div1&2 ABCD, CLII, III EFG
Canadian Standards Association	XP CL1, Div1&2 ABCD, CLII, III EFG

Electrical

Input Power	85-250 VAC, 50-60Hz 12-36 VDC
Relay Contact Rating	1 x DPDT Resistive: 8 Amp @ 250 VAC; 8 Amp @ 30 VDC Inductive: ½HP @ 240 VAC, ¼HP @ 120 VAC
Repeatability	0.1" (2.6mm)
Static Protection	Peak Surge Current: 800 Amps; Clamp Voltage: 75 Volts
Selectable Fail-safe	High or Low
Cable Entry	2 x ¾" NPT



Resonator Sample Applications

ORDERING INFORMATION

RS80 / a / b / c / d / e / f / g / PL:

/a	**Housing**	
	A1	Single Compartment Aluminum Housing
	A1W	Single Compartment Aluminum Housing with Glass Viewing Cover
/b	**Process Connection**	
	P7	¾" MNPT (Standard)
/c	**Sensor Material**	
	S6	316L SS (Standard)
/d	**Probe Finish**	
	X	Standard Finish
/e	**Power**	
	1	18-36 VDC
	2	100-136 VAC
	3	200-245 VAC
	4	Universal Power (12-36 VDC, 85-250 VAC)
/f	**Options**	
	X	None
	MM	M20 Conduit Connection Brass (CSA Only)
/g	**Approvals**	
	X	No Approvals
	FMX	Factory Mutual Standards (FM) Explosion Proof
	CSX	Canadian Standards Association (CSA) Explosion Proof

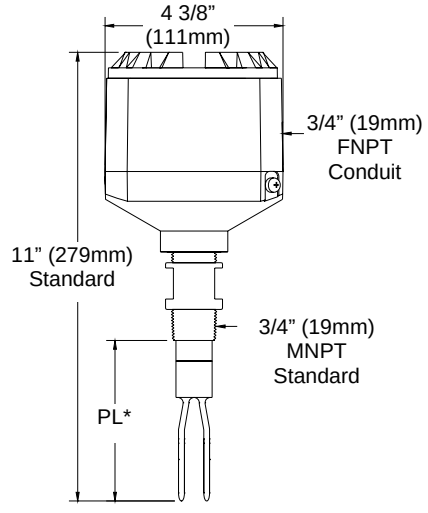
/PL **Probe Length**

3-3/8" (86mm) Standard, Specify extended lengths in 1.0 in (25.4 mm) increments up to 120 in. (3048 mm)

PRINCIPLE OF OPERATION

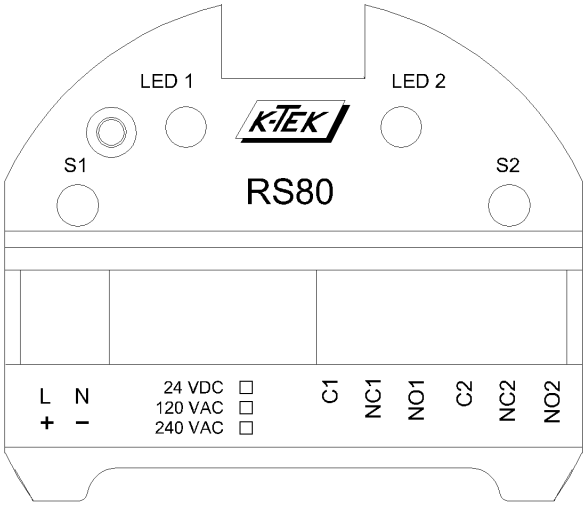
The Resonator utilizes a piezoelectric driven tuning fork that exhibits a large change in resonant frequency when immersed in any liquid. A "smart" microprocessor-based electronic unit keeps the sensor in a resonant state as it changes from dry to wet or wet to dry. The resonant frequency is continuously monitored for changes created by a wet or dry sensor and an alarm is provided via a relay. An important feature of the Resonator is that its resonant frequency is not significantly affected by coating on the fork until the space between the forks is bridged. The Resonator's ability to identify true liquid level in viscous, coating or aerated liquid is unparalleled. The self-test option checks for fault conditions such as crystal damage and excessive product build up on the sensor. Applications include redundant high/low liquid level without concern for parameters such as specific gravity, dielectric constant or mounting position of the sensor.

DIMENSIONS



*Trip Point 3/4" from end probe type

MODULAR ELECTRONICS CONNECTION DIAGRAM



Note: See RS85 Data Sheet (RS85-0202-1) for optional process connections, coatings and materials of construction for more difficult applications.

K-TEK
18321 Swamp Road
Prairieville, Louisiana 70769
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RS80-0202-1 Rev e (08-2007)
DCN0149
For latest version of this data sheet, visit www.ktekcorp.com.

Email: sales@ktekcorp.com
Website: www.ktekcorp.com

Series 16 Modules
Controls – Solid State Plug-In Modules

- Compact Size
- Modular Plug-in Design
- CSA Approved
- U.L. "Motor Control"
- Solid State Reliability
- LED Monitoring
- Various Time Delays
- Low Voltage Sensor

Series 16M – General Purpose Control

• New Microprocessor Design

Designed for either differential or single-level service. U.L. "Motor Controller" listing, CSA. 8 pin socket with screw-type connections make the unit easy to install and service. Sensitivity of up to 1 million ohm/cm.

Series 16HM – High Sensitivity Control

Series 16HM is similar to Series 16M but provides higher sensitivity up to 5.5 million ohm/cm. Probe voltage is 12 VDC for applications with low conductive media.

Series 16DM – DPDT Load Contact

Similar to Series 16M but with DPDT load contacts. Eliminates the need for slave relays. 11 pin octal plugs. Requires little panel space. General purpose single-level or differential applications. U.L., CSA listed.

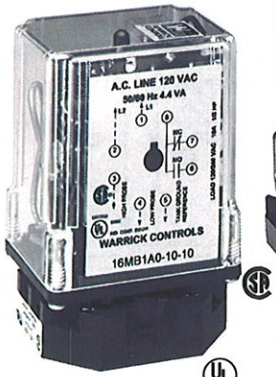
Series 16VM – Field Selectable Sensitivity

Similar to Series 16M but with the added flexibility of field adjustable sensitivity, made possible through external setpoint resistors. Uses 11pin octal socket. U.L., CSA listed.

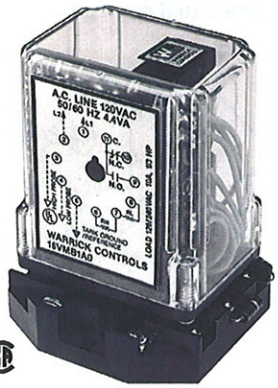
Specifications

Contact Design	
Series 16M & 16HM	1 N.O. & 1 N.C. (1 form C)
Series 16DM	2 N.O. & 2 N.C. (2 form C)
Series 16VM	1 N.O. & 1 N.C. (1 form C)
Contact Rating (120. 240 VAC)	
Series 16M & 16HM	10 amp Resistive 1/3 hp
Series 16DM	5 amp Resistive 1/10 hp
Series 16VM	10 amp Resistive 1/3 hp
Mode of Operation	Direct/Inverse, factory set
Sensitivity	
Series 16M	0-1M ohm, factory set
Series 16HM	0-5.5M ohm, factory set
Series 16DM	0-1M ohm, factory set
Series 16VM	0-1M ohm, field adjustable
Primary Voltage	24 VAC, 120 VAC, 240 VAC (+10%/-15%) 208/240: 187 V min. to 255 V max. VAC 50/60 Hz
Secondary Voltage	
Series 16M	12 VAC, 1.5 mA
Series 16HM	12 VDC
Series 16DM & 16VM	12 VAC, 1.5 mA
Temperature	-40°F to 150°F (-40°C to 65°C)
Approvals	U.L. 508 File #E44426; CSA
Terminal Style	Screw connector
Options	Time Delays

New!
Microprocessor Design



Series 16M/16HM



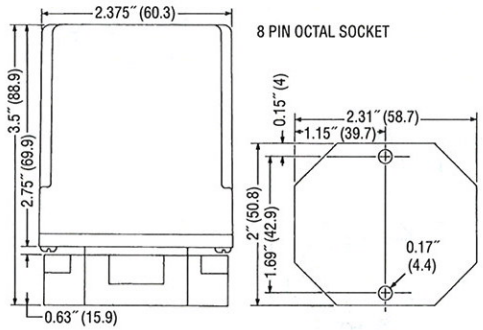
Series 16DM/16VM

Applications

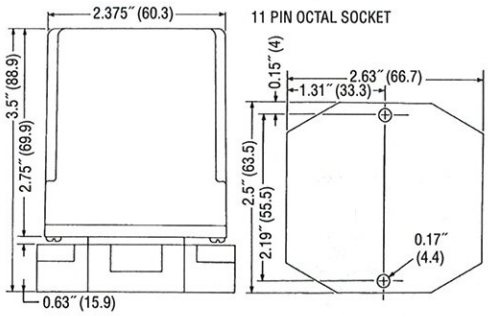
- Single-Level Service
- Point Level
- Valve Control
- Differential Service
- Alarms
- Pump Control

Dimensions

Series 16M & 16HM



Series 16DM & 16VM



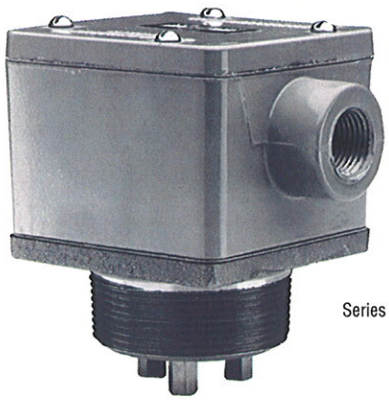
Note: Controls also available with DIN mount socket.

Series 3E – Pipe Thread Attachment
Series 3N – Flat Surface Mounting

- Up to 7 Probes
- Threaded Attachment (3E)
- CSA Approved
- FM Approved (3E)
- Flat Mounting (3N)
- Available in Various Body Metals
- U.L. Recognized (3E)

Series 3E fittings are cast metal, pressure-tight assemblies capable of handling 1-7 probes. Attachment to vessels is accomplished with external pipe threading. 3E Fittings require the use of 3R rigid or 3W wire suspended electrodes.

Series 3N fittings accommodate 1-3 probes operating at atmospheric pressure. The assembly mounts on a flat surface atop open tanks or closed vessels. 3N Fittings require the use of 3R rigid or 3W wire suspended electrodes.



Series 3E

Series 3N

Specifications

Type of Connection	
Series 3E	Threaded
Series 3N	Flat Surface Mounting
Probes	
Series 3E	1 thru 7
Series 3N	1 thru 3
Terminal Housing	Die cast aluminum, epoxy coated
Body Material	
Series 3E	Cast iron, red brass, 316 stainless steel
Series 3N	PVC, red brass, 316 stainless steel
Pressure/Temperature	
Series 3E	125 psig @ 353°F (cast iron); 250 psig @ 406°F (brass, 316 s.s.)
Series 3N	0 psig @ 150°F (PVC); 0 psig @ 500°F (brass, 316 s.s.)
Approvals	
Series 3E	U.L. File # MP2489, Vol. 1, Sec. 2; CSA; FM
Series 3N	CSA File # LR11644

Dimensions

Series	No. of Probes	Attachment to Vessel	Conduit Boss Thread Size	Terminal Housing Size (W″ x D″ x H″)
3E	1	1″ NPT	1/2″ NPT	2-1/4 x 2-1/4 x 2-1/4
	2	2″ NPT	1/2″ NPT	3-1/4 x 3-1/4 x 2-3/8
	3	2″ NPT	1/2″ NPT	3-1/4 x 3-1/4 x 2-3/8
	4	2-1/2″ NPT	1/2″ NPT	3-1/4 x 3-1/4 x 2-3/8
	5	3″ NPT	3/4″ NPT	4 x 4 x 2-1/2
	6	3″ NPT	3/4″ NPT	4 x 4 x 2-1/2
	7	3″ NPT	3/4″ NPT	4 x 4 x 2-1/2
3N	1	2-1/4″ square flat pad, 1-1/2″ dia. hole in top of vessel secured with #10 machine screws at the corners of a 1-1/2″ square	1/2″ NPT	2-1/4 x 2-1/4 x 2-1/4
	2		1/2″ NPT	3-1/4 x 3-1/4 x 2-3/8
	3		1/2″ NPT	3-1/4 x 3-1/4 x 2-3/8

Applications

- Open Tanks
- Closed Vessels
- Water
- Diluted Corrosive Liquids

How to Order

Use the **Bold** characters from the chart below to construct a product code.

3E **X** **X**

Series
3E **3N**

Number of Probes[1]
1 – One **5** – Five
2 – Two **6** – Six
3 – Three **7** – Seven
4 – Four

Body Material
A – Cast Iron (3E) PVC (3N) **B** – Red Brass **C** – 316 Stainless Steel

Notes:
1. 3N features up to three probes only.
2. Special modifications available. Consult factory.

Series 3B – Two-Piece Threaded Coupling
Series 3H – One-Piece Extended Core Fittings

- Compact Size
- Stainless Steel Body
- Teflon® or Nylon Insulation Sleeve
- U.L. Recognized
- Pressure Tight
- Various Threaded Sizes
- CSA Approved
- FM Approved

Series 3B

Series 3H

Series 3B fittings are compact pressure tight assemblies that hold a single electrode probe for use in water and chemicals. These fittings incorporate a 1/4-20 female thread that must be combined with a Series 3R (rigid rod electrode) or Series 3W/3Y (wire suspended electrode) to make a complete assembly.

Series 3H electrode fittings feature a one piece electrode core which can be trimmed to length in the field. One piece construction simplifies installation.

Both 3B and 3H fittings are available with three different mounting threads, and are capable of withstanding up to 400 psig at 406°F.

Specifications

Body Material	316 Stainless Steel
Insulation Sleeve	
Series 3B	Teflon®
Series 3H	Nylon, Teflon®
Pressure/Temperature	
Series 3B	400 psig @ 406°F (saturated steam)
Series 3H	2000 psig @ 75°F; 400 psig @ 406°F (saturated steam)
Approvals	U.L. File # MP2489, Vol. 1 Sec. 1; CSA; FM
Electrode Required	
Series 3B	1/4″ rod (for lengths up to 4′)[1]; or Wire-suspended (3W/3Y Series 4′ and over)[1]
Series 3H	Electrode supplied, may be cut to desired length
Thread Size	3/8″ - 18 NPT, 5/8″ - 18 NF, 5/8″ - 24 NEF

Note:
1. See pages D-28 and D-29 for 3R and 3W probes.

Applications

- Single Level Service
- For Water, Caustics, Acids and Chemicals
- High Temperature Atmosphere
- High Pressure Conditions

How to Order Series 3B

Use the **Bold** characters from the chart below to construct a product code.

3B X X

Series
3B

Thread
1 – 3/8″ - 18 NPT
2 – 5/8″ - 18 NF
3 – 5/8″ - 24 NEF

Metal Parts
B – 316 S.S.

How to Order Series 3H

Use the **Bold** characters from the chart below to construct a product code.

3H X X X

Series
3H

Thread
1 – 3/8″ - 18 NPT
2 – 5/8″ - 18 NF
3 – 5/8″ - 24 NEF

Sleeve[1]
A – Nylon 3/4″ Long **B** – Teflon 3/4″ Long

Length (Feet)[2]
1 – One **2** – Two **3** – Three

Notes:
1. Longer Teflon® sleeves are available. Contact factory or your representative
2. Custom probe and insulation lengths are available. Contact your representative.

ARCADIS

Attachment 4

Draft SOPs

Tallevast
SOP No. 020 (DRAFT)

Critical Alarm Testing

Description:

This Standard Operating Procedure (SOP) is to be used when performing critical alarm testing. Critical alarm testing is to be performed at least once every quarter

Caution:

This system removes contaminated groundwater and, once treated, discharges treated water to the Manatee County Utility Operations. Therefore, it is EXTREMELY IMPORTANT that the operator be prepared to shut down the treatment system at any time there is question that the water not receiving FULL TREATMENT.

Equipment:

Various

Notifications:

Project Manager, Lockheed Martin, site personnel

Abbreviations

HMI	Human Machine Interface
SOP	Standard Operating Procedure
SU	Standard Units

Step by Step Procedure

Critical alarms for the treatment system are those alarms which will shut down the system if operating parameters are outside of their normal operating range. Those critical alarms are as follows:

1. High/High level in extraction wells (LAHH-101 to LAH-110)
2. High level in tank T-400 (LAH-400)
3. Low/Low level in tank T-400 (LALL-401)
4. High/High level in tank T-400 (LSHH-402B)
5. High/High/High level in tank T-400 (LAHHH-402A)
6. High level in containment dike (LAH-403)
7. High/High level in containment dike (LAHH-404B)
8. High/High/High level in containment dike (LAHHH-404A)
9. High pH at acid injection point (AAH-201)
10. Low pH at acid injection point (AAL-201)
11. High pH at caustic injection point (AAH-301)
12. Low pH at caustic injection point (AAL-301)
13. High level in treatment building sump (LAH-500)

14. High differential pH between effluent pH probes (AAH-302)
15. High water pressure in aerator piping (PAH-400)
16. High/High water pressure in aerator piping (PAHH-400)
17. Low water pressure in aerator piping (PAL-400)
18. High air pressure in aerator airline (PAH-401)
19. Low air pressure in aerator airline (PAL-401)

1. If the system is off-line, restart the system following procedures outlined in SOP No. 002 System Start-Up. Allow for the system to operate for at least 15 minutes prior to initiating alarm tests. Any set points adjusted for the purpose of a test must be returned to the original set point immediately after the test. Note in the log sheet if the alarm worked correctly. If any alarm does not operate correctly, shut down the extraction wells and treatment system through the Human Machine Interface (HMI) and contact the Project Manager.
2. Test HMI transmitter alarms by adjusting individual alarm set points to trigger system alarm under normal operating conditions. Record system response and triggered alarms in the site log book and verify system response. Restart the system following each alarm test and allow the system to operate for 15 minutes prior to initializing subsequent alarms.
3. High/High level in extraction wells (LAHH-101 to LAH-110) alarm will be tested by decreasing the high/high set point on the Human Machine Interface (HMI) to the operational level of the extraction well. When this parameter is changed the extraction system wells should all shut off. When completed, change the parameter back to the original setting and restart the treatment system as described in SOP No. 002 System Start-up. Complete the process for every extraction well.
4. High level in tank T-400 (LAH-400) will be tested by shutting down the Photo-Cat system and allowing the extraction wells to continue to operate. As the extraction wells fill the tank, the high level alarm will be triggered and the extraction system and the sump pump P-500 should shut down.
5. Low/Low level in tank T-400 (LALL-401) will be tested by shutting down the extraction system and changing the low tank set point on HMI to 5% tank volume. Allow the treatment system to operate and the water level in the tank will drop below the level of the Low/Low float switch in the tank. The Photo-Cat system should shut down.
6. High/High level in tank T-400 (LAHH-402B) will be tested by raising the float switch in tank T-400. The switch is activated by turning the switch upside down. When activated the entire system should shutdown.
7. High/High/High level in tank T-400 (LAHHH-402A) will be tested by shutting down the treatment system and changing the High level set point on LAH-401 to 110%. When the tank fills to the level of the High/High/High switch the extraction system should shut down.
8. High level in containment dike (LAH-403) will be tested by manually triggering the switch. To trigger the switch use a hose and nozzle to wet the end to the transmitter positioned inside the containment dike with water from the hose. The entire system should shut down.
9. High/High level in containment dike (LAHH-404B) will be tested by raising the float switch in the containment tank. The switch is activated by turning the switch upside down. When activated the entire system should shut down.
10. High/High/High level in containment dike (LAHHH-404A) will be tested by manually triggering the switch. To trigger the switch use a hose and nozzle to wet the end to the transmitter positioned inside the containment dike with water from the hose. The entire treatment system should shut down.

11. High pH at acid injection point (AAH-201) will be tested by temporarily disabling the acid injection pump and allowing the pH to rise. Disable the acid injection pump by unplugging it. The pH will rise and after approximately 5 minutes the Photo-Cat system should shut down.

12. Low pH at acid injection point (AAL-201) will be tested by raising the influent pH set point to 10 standard units (S.U.), which is above the natural pH of the influent water. After approximately 5 minutes the Photo-Cat system should down.

13. High pH at caustic injection point (AAH-301) will be tested by lowering the effluent pH set point to 2 S.U., which is below the typical operating pH of the process water. After approximately 5 minutes the Photo-Cat system should shut down.

14. Low pH at caustic injection point (AAL-301) will be tested by temporarily disabling the caustic injection pump and allowing the process water pH to fall. Disable the caustic injection pump by unplugging it. The pH will fall and after approximately 5 minutes the Photo-Cat system should shut down.

15. High level in treatment building sump (LAH-500) will be tested by manually triggering the switch. The switch is located in the building sump and can be manually triggered by physically lifting the moveable portion of the switch up. The switch is on a 5 minute time delay so must be held in the up position for that amount of time before the entire treatment system should shut down.

16. High differential pH between effluent pH probes (AAH-302) will be tested by disabling the secondary pH probe. Disable the secondary pH probe by removing the magnetic quick connect on the top of the probe. After 5 minutes of operation the Photo-Cat system should shut down.

17. High water pressure in aerator piping (PAH-400) will be tested by closing valves BV-401 and BV-402 while the aerator system is in operation. The dead head pressure of the pump should trigger the alarm and cause the entire system to shut down.

18. High/High water pressure in aerator piping (PAHH-400) will be tested by closing valves BV-401 and BV-402 while the aerator system is in operation. The dead head pressure of the pump should trigger the alarm and cause the entire system to shut down.

19. Low water pressure in aerator piping (PAL-400) will be tested by changing the low pressure set point on the HMI to a pressure which is above the typical operating set point of the aerator system. After approximately 1 minute of operation the entire treatment system should shut down.

20. High air pressure in aerator airline (PAH-401) will be tested by changing the high pressure set point on the HMI to a pressure which is below the typical operating set point of the aerator system. After approximately 1 minute of operation the entire treatment system should shut down.

21. Low air pressure in aerator airline (PAL-401) will be tested by changing the low pressure set point on the HMI to a pressure which is above the typical operating set point of the aerator system. After approximately 1 minute of operation the entire treatment system should shut down.

Related SOPs

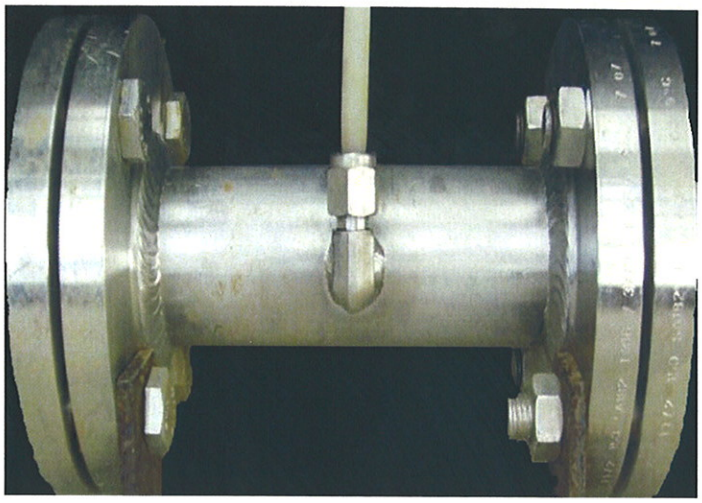
002-System Start-Up

Tallevast
SOP No. 021 (DRAFT)

Aerator Cleaning

Description:

This Standard Operating Procedure (SOP) is to be used when cleaning aerators A-400 and A-401. Aerators require cleaning when the specified air flow cannot be maintained.



Caution:

This system removes contaminated groundwater and, once treated, discharges treated water to the Manatee County Utility Operations. Therefore, it is EXTREMELY IMPORTANT that the operator be prepared to shut down the treatment system at any time there is question that the water not receiving FULL TREATMENT.

Equipment:

Nitrile gloves, safety glasses, splash shield, nitrile apron, nitrile sleeves, 5/8" wrenches, 10-gallon plastic tank, 93% sulfuric acid

Notifications:

Project Manager, Lockheed Martin

Abbreviations

LOTO	Lockout/Tagout
PPE	Personal Protective Equipment
SOP	Standard Operating Procedure

Step by Step Procedure

1. Shut down the treatment system prior to performing this task. Refer to SOP No. 003 System Shut Down.
2. Don nitrile gloves and safety glasses before completing any additional tasks.
3. Close valves BV-401 and BV-402 if aerator A-400 will be taken out for cleaning or valves BV-403 and BV-404 for aerator A-401.
4. Disconnect airline from check valve attached to aerator.
5. Remove bolts from flanges on influent and effluent side of aerator to be removed.
6. Remove aerator and place in 10-gallon plastic tank.
7. Don splash shield, nitrile apron and nitrile sleeves before completing any additional tasks.
8. Fill the 10-gallon tank with water such that it covers the entire aerator. Carefully pour approximately 0.5 liters of 93% sulfuric acid into the 10-gallon tank with the aerator in it. Affix proper labels to the tank to designate an acidic solution. Leave the aerator to soak in the acidic solution over night.
9. The treatment system can be restarted with only a single aerator in operation. To do so, lock out and tag out the ball valves for the aerator removed for cleaning. Refer to SOP No. 011 LOTO
10. After soaking the aerator overnight, don all personal protective equipment (PPE) described in the equipment section before proceeding.
11. Remove the aerator from the 10-gallon tank and rinse with water in a sink for at least 5 minutes. Neutralize the acidic solution and transfer to the influent tank.
12. Shut down the treatment system. Refer to SOP No. 003 System Shut Down.
13. Reinstall the aerator in the operating position. If gaskets appear worn, replace them with new gaskets.
14. Reconnect the aerator air line.

15. Open valves closed in Step 3 if the aerator that was cleaned is put in service. Restart the treatment system as described in SOP No. 002 System Start-Up. Check the aerator for water and air leaks. If leaks are present, shut down the system and repair the leaks.

Related SOPs

- 003-System Shutdown
- 011-Lockout/Tagout

ARCADIS

Attachment 5

Draft Contingency Plan

ARCADIS
Infrastructure, environment, facilities

DRAFT

Lockheed Martin Corporation

Appendix F

Contingency Plan

Interim Remedial Action
Former American Beryllium Company Site
1600 Tallevast Road
Tallevast, Florida

December 2006
Revised September 19, 2008

Table of Contents

Tables

Figures

ARCADIS

1. Introduction

This Contingency Plan (CP) was prepared by ARCADIS on behalf of Lockheed Martin Corporation (Lockheed Martin) for the Interim Remedial Action (IRA) groundwater pump and treat (PAT) system for the former American Beryllium Company (ABC) Site (Site) located in Tallevast, Florida. The IRA was conducted in accordance with Consent Order No. 04-1328 for the Site executed by and between Lockheed Martin and the Florida Department of Environmental Protection (FDEP), effective July 28, 2004.

Lockheed Martin has implemented Site assessment activities necessary to delineate the nature and extent of constituents of concern (COCs) in groundwater. The results of these Site assessment activities were documented in the Site Assessment Report Addendum 3 (SARA 3) approved by FDEP.

1.1 Site Location/Address

The former ABC Site is located at 1600 Tallevast Road in Tallevast, Manatee County, Florida.

1.2 Site Phone Number

The phone number at the Site is 941-360-1843

2. Emergency Response Procedures

This section lists the identified potential emergencies associated with the IRA groundwater PAT system and provides a description of emergency response procedures, should they become necessary. Specifics concerning procedures to be followed are presented below. All emergency efforts should also be addressed in accordance with the Health and Safety Plan (HASP) and with site specific Standard Operating Procedures (SOPs).

The IRA groundwater PAT system removes contaminated groundwater and, discharges treated water to the Manatee County Utility Operations (MCUO). Therefore, it is extremely important that the operator be prepared to shut down the IRA groundwater PAT system at any time there is a question that the water is not receiving full treatment or that the system might be compromised due to an emergency.

Any time local public response agencies such as police, fire and/or ambulance are called, the Lockheed Martin Emergency Coordinator or their designees (see Table 1) must be called and provided pertinent information so that if required, the CP can be implemented.

The Emergency Coordinators of their designees are authorized to commit all necessary resources during an emergency, and at least one coordinator is always on-site or on call and can reach the facility on short notice during an emergency. After an emergency, the Emergency Coordinator will provide for the management of recovered waste, contaminated soil or other debris, and any contaminated surface water or groundwater.

2.1 Initial Emergency Needs

Examples for potential triggering events for the IRA groundwater PAT system CP are summarized below.

- Medical Emergencies
  - on-site personnel
  - non site-related personnel
- Fire
- Mechanical/process failures
  - breakage of piping and/or appurtenances
  - tank leak
  - treatment unit malfunction
- Operator error
  - failure to follow SOPs
- Spills or emissions (usually caused by one of the above)
  - hazardous materials
  - release of untreated or insufficiently treated water

- release of treatment media

- Property damage
  - to third party property (i.e., off-site facilities)
  - by a third party (i.e., vandalism, car accident, damage by subcontractor during repair or maintenance)
- Natural disasters
  - flood
  - tornado
  - hurricane
  - earthquake

2.1.1 Assessment of Emergency Need

In the unlikely event there is an imminent or actual emergency situation, the first action of an individual who discovers the emergency will be to immediately contact the Lockheed Martin Emergency Coordinator or their designees listed on Table 1. All emergency procedures will be initiated by the Emergency Coordinator or their designees in the manner outlined below.

Identification of Incidents

Upon a fire, explosion, release, or other incident, the Emergency Coordinator or their designees must immediately identify the character, source, amount, and extent of any released materials. This will be accomplished by observation, analysis, or any practical means necessary. These initial observations will be forwarded to the proper emergency response teams with suggested precautions

Assessment of Possible Hazards

The Emergency Coordinator or their designees and other appropriate individuals (if necessary) will assess possible hazards to human health or the environment that may result from the incident. The assessment will consider both direct and indirect effects of the incident (e.g., in case of fire or explosion, the assessment will consider the effect of release of toxic, irritating, or asphyxiating gases and surface water runoff from water used to control fires).

Emergency Coordinator Response

Upon the occurrence of an emergency situation, the Emergency Coordinator or their designees will inform any personnel at the facility of the emergency. In addition, the appropriate local agencies listed on Table 1 having response roles will be notified by telephone if their assistance is required or if there is any threat to the surrounding community.

2.1.2 Stabilization or Isolation of Emergency Situation

Immediately after assessing the hazards of the fire, explosion, or release, the Emergency Coordinator or their designees will take all reasonable measures necessary to ensure that the fire, explosion, and/or release do not recur or spread. Necessary actions may include stopping processes and/or operations, overseeing the operations of collecting and containing the released materials, removing and isolating containers, and inspecting the structural integrity of the facility. If the facility stops operations in response to a fire, explosion, or release, the Emergency Coordinator or their designees will monitor for leaks, pressure build-up, or ruptures in valves, pipes, or other appurtenances.

If the Emergency Coordinator or their designees determine that the facility has had a release, fire, or explosion that could threaten human health and/or the environment outside the facility, they should take the following actions:

- If the assessment indicates that evacuation of local areas may be advisable, the appropriate local agencies listed on Table 1 must be notified immediately and provide the following information:

    - name and telephone number of the person making the notification

- name and address of the facility
- time and type of incident (e.g., release, fire)
- name and quantity of material(s) involved, to the extent known
- the extent of injuries, if any
- the possible hazards to human health or the environment outside the facility

- Record the time and type of incident (e.g., fire, explosion, or release) name and quantity of material(s) involved, to the extent known, and potential hazards to human health and/or the environment outside of the facility.

- Immediately after an emergency, the emergency coordinator must provide for treating, storing, or disposing of recovered waste, contaminated soil or surface water, or any other material that results from a release, fire, or explosion at the facility. The emergency coordinator must ensure that, in the affected area(s) of the facility:
  - no waste that may be incompatible with the released material is treated, stored, or disposed of until cleanup procedures are completed
  - all emergency equipment listed in the contingency plan is cleaned and fit for its intended use before operations are resumed

- The emergency coordinator or their designee must note in the operating record the time, date, and details of any incident that requires implementing the CP. Within 15 days after the incident, a written report must be submitted to the FDEP Regional Administrator. The report must include the following:
  - name, address, and telephone number of the facility
  - date, time, and type of incident (e.g., fire, explosion)
  - name and quantity of material(s) involved
  - the extent of injuries, if any

- an assessment of actual or potential hazards to human health or the environment, as applicable

- estimated quantity and disposition of recovered material that resulted from the incident

2.2 Emergency Procedures

In the event of an emergency incident requiring evacuation of the Site, the main gate will serve as the assembly area (see figure 1). The signal for evacuation of the Site is three blasts of a horn (e.g., air horn or vehicle horn). Different types of emergencies are described below.

2.2.1 Medical Emergencies

Medical emergencies may not require implementation of this CP. Nevertheless, directions to the local hospital are provided on Figure 2. If needed, ambulance service can be arranged by contacting the Southern Manatee Fire Department at 911 or (941) 751-7675.

2.2.2 Fire

In the event of a fire, the following procedures should be followed:

- call 911, notify fire and police departments
- notify the Emergency Coordinator or their designees
- if fire is small, try to use a fire extinguisher to extinguish it
- evacuate area, if necessary, and assemble at the main gate

The fire department has a HazMat team with extinguishing agents such as foam and dry chemicals. . The local police department will provide crowd and traffic control while the local hospital can treat injuries from exposure to chemicals stored and used on site.

2.2.3 Spill

Spilled chemicals, whether inside of or outside of the treatment system facility, should be effectively and quickly contained and cleaned up. A spill response kit will be available on site for containing or neutralizing acid or caustic leaks or spills less than 5 gallons. In the event of larger spills, call the Waste Disposal Contractor SWS First Response at 1.800.852.8878 for 24 hour emergency response. SWS First Response will respond with absorbents and containment materials for spill clean-up. Following the request for emergency spill assistance, if safely able to do so, attempt to get material data safety sheet (MSDS) information for the spilled material for the emergency respondents use. MSDS books are maintained in the operator's office and the treatment building. If emergency responders evacuate the spill area, follow their instructions and assemble by the main gate of the facility.

The Emergency Coordinator or their designees must be notified of all spills. If the spill is less than 1,000 gallons, it should be reported to the Manatee County Environmental Management Department (MCEMD) at 941.742.5980.

In the event of a major spill (e.g., more than 1,000 gallons), immediately notify the FDEP 24-hour State Warning Point Spill Hotline 800.320.0519 and the MCEMD at 941.742.5980. Contact the National Response Center 800.424.8802 if the spill includes the release of a hazardous material above its listed reportable quantity.

The following information should be provided when reporting the spill:

- location or address of the discharge
- source and cause of the discharge
- estimated amount of the discharge
- whether the discharge was contained on-site and any clean up actions taken to date
- description of area affected by the discharge, including name and water body affected, if any
- other persons or agencies contacted
- other relevant information

The written follow-up report should be submitted to the MCEMD within 5 days of the time the spill is discovered.

2.2.4 Property Damage

In the event of property damage to a third party property (i.e., off-site facilities) or by a third party, notify the Emergency Coordinator or their designees. The following information should be provided when reporting the incident:

- location or address of the incident
- description of damage
- source and cause of the incident
- other persons or agencies contacted
- other relevant information

2.2.5 Natural Disasters

Potential natural disasters that might occur in the Tallevast area include flooding, tornados, and hurricanes. In accordance with the United States Geological Survey (USGS) *2008 United States National Seismic Hazard Map,* Florida is considered to be one of the lowest hazard risk locations for earthquakes in the United States, so earthquakes are unlikely. Emergency response procedures for natural disasters are described below.

2.2.5.1 Flood Procedures

Floods usually occur as a result of heavy rains caused by severe thunderstorms or a hurricane. If potential flooding conditions exist:

- make sure Site personnel know the emergency phone numbers and when to call these numbers
- prepare for a potential flood
- shut down and secure the IRA groundwater PAT system

- store treatment systems chemicals above flood levels
- shut down external power, if necessary
- sandbag doorways
- move vehicles to higher ground
- keep drains and storm grates free of leaves and other debris

During a flood:

- keep a battery-powered radio tuned to a local station and follow all emergency instructions
- if personnel are caught in facility buildings by rapidly rising waters, call 911 for help and move to higher levels with weatherproof clothing, a flashlight, a cellular phone, and a portable radio
- do not walk or wade in flooded areas
- be prepared to evacuate and if advised to evacuate, do so immediately because evacuation is much simpler and safer before flood waters become too deep for ordinary vehicles to drive through

If evacuating by car:

  - do not drive where water is over the road or past barricaded road signs
  - if car stalls in a flooded area, abandon it as soon as possible and walk to safety in the direction driven from
  - follow recommended evacuation routes, as shortcuts may be blocked

After a Flood:

- before re-entering a treatment system building, check for structural damage that could cause the building to collapse
- when re-entering a treatment system building, use flashlights, rather than turning the power on

- have a licensed electrical professional from the designated electrical contractor (Table 1) check the electrical panels, outlets, and equipment for safety before using

2.2.5.2 Tornado Procedures

Tornadoes usually occur in the spring and summer. They are often formed by severe thunderstorms. Considered natures most violent and erratic storms, they consist of whirling winds of up to 300 miles per hour (mph). Tornadoes can sweep through an area, causing serious damage and destruction. In addition to injuries and structural damage, electrical shorts, gas leaks, etc. may create fires or other hazards.

Tornado watches and warnings are issued by the local National Weather Service.

Tornado Watch Weather conditions are considered favorable for tornadoes to form in and near the watch area. These conditions are determined by the National Weather Service which transmits the watch information through weather radio, television, and radio. When a tornado watch has been issued for the Tallevast area, monitor weather radio, local radio, or television for additional watches or warnings.

Upon hearing the announcement for a tornado watch, the Emergency Coordinator or their designees will be responsible for notifying all Site personnel. The notification will include the following information:

- the Tallevast area is under a tornado watch
- time tornado watch expires
- instructions to shut down IRA groundwater PAT system

Tornado Warning A tornado warning means that a tornado has been sighted by the public or local law enforcement, or that Doppler radar has indicated an area or rotation that could develop or had developed into a tornado. Tornados can form and move quickly; therefore, there may not be adequate time to issue a warning. If severe thunderstorms occur, be alert to the fact that a thunderstorm could trigger a tornado, and be prepared**.** Upon hearing the announcement for a tornado warning, take shelter immediately.

If employees are on the Site, they should proceed to the designated emergency shelter/area. If employees are outside, they should immediately enter the nearest building and proceed to the designated emergency shelter/area.

Employees should remain in the designated emergency shelter/area until the tornado warning is over and the “all clear” signal is given by a local radio or TV station.

If an employee is caught in the open, they should:

- move at right angles to the tornado
- attempt to reach shelter
- if there is no time to escape or find shelter, lie flat in a ditch or depression but avoid areas subject to rapid water accumulation or flooding in heavy rains

Trouble areas/places to avoid:

- all outside walls, elevators and windows
- any low-lying area that could flood
- vehicles – do not use for shelter
- building areas with a large roof span

2.2.5.3 Hurricane Procedures

A hurricane is a storm with sustained winds of at least 74 mph blowing counterclockwise around a calm center of low pressure. Wind gusts may exceed the sustained winds by 25-50%. Hurricanes are rated by their wind speed. Hurricanes can also generate tornadoes of 150-300 mph Hurricane intensities:

Category 1 – Damage – Minimal – Winds 74-95 mph

Category 2 – Damage – Moderate – Winds 96-110 mph

Category 3 – Damage – Extensive – Winds 111-130 mph

Category 4 – Damage – Extreme – Winds 131-155 mph

Category 5 – Damage – Catastrophic – Winds over 155 mph

A Hurricane Watch is declared when hurricane conditions are possible and may threaten an area within 36 hours. A Hurricane Warning means that a hurricane is expected to strike within 24 hours.

Hurricanes are usually confined to certain geographical regions, which are usually alerted to a hurricanes possible arrival well in advance. When there may be an impending hurricane, begin to prepare at the earliest warning.

Before the storm:

- Listen to weather forecasts and any available information regarding the weather regularly.
- Remember that weather can be unpredictable. Begin by anticipating the worst and being prepared to complete all the tasks for a safe and successful shut down and evacuation.
- Shut down and secure the IRA groundwater PAT system.
- Store treatment system's chemicals above flood levels.
- Shut down external power, if necessary.
- Locate the tools and equipment that may be needed and assemble at a central location. These items should include, but are not limited to flashlights, batteries, tarps, hand tools, cordless drill, and any other items that may be helpful.
- Walk the facility and identify any items that can be secured or stored inside until the storm passes. Secure those items immediately.
- Move any vehicles that may possibly prove to be in the way.
- Be aware that in the days prior to a storm, the power may go out frequently.
- Check doors and windows. Secure any doors that may open in high winds. Seal windows as appropriate.
- Identify and collect important facility documentation. Move the documents to a location that is not vulnerable to the situation at hand.
- Unplug computers, fax, modem lines, and any electrical equipment in the facility that is not needed for emergency information. Move equipment away from any windows.

- Keep the telephone plugged in until you leave the facility.
- Bring a copy of this CP.
- Contact the Emergency Coordinator or their designees for guidance on closing the facility. If instructed to evacuate by officials, do so immediately.
- Before closing the facility or evacuating, it is imperative to ensure that all employees are off the premises. Quickly complete a thorough walk through of all areas of the buildings and property. Notify all employees that the facility is being evacuated. Anyone in the buildings must immediately leave the premises.
- If state, local, or emergency personnel are on the scene, follow all directions as given by those officials.

After the storm:

Once the storm has passed and it has been determined safe to return to the facility, take the following steps:

- Carefully walk the perimeter of the facility to look for damage from the storm. If possible, do this in pairs. Keep away from downed power lines – they may still be live. Report them immediately to the utility company.
- Check the treatment system building for damage. Look for leaks, water spots, and wind damage. Identify any potential treatment units that may have been affected.
- Secure areas that are damaged and may be dangerous.
- Make temporary repairs to prevent further damage.
- Inspect fire protection equipment to be sure it is in service.
- Prepare an incident report complete with photos to document any damage. Save remnants of damaged or destroyed property for insurance adjusters or until directed by the Emergency Coordinator or their designees to dispose of items.

General Preparedness

- Keep this CP updated. Specifically emergency contacts, utility shut off information and utility company phone numbers.
- Keep a first aid kit adequately stocked.
- Make note of evacuation routes and shelters in your area.

2.2.5.4 Earthquake Procedures

As previously stated, Florida is considered to be one of the lowest hazard risk locations for earthquakes in the United States. However, chances of safety and survival can greatly be increased by being aware and prepared. Since knowledge and preparation are keys to survival during and after an earthquake, the following steps should be taken:

- Stay calm.
- If at all possible, shut down the IRA groundwater PAT system.
- Drop, cover, and hold on. Move only a few steps to the nearest safe place. If possible take cover under a sturdy object, such as a desk or table. Be prepared to move with the object. Stay indoors until the shaking stops and you're sure it's safe to exit. Stay away from windows and expect any fire alarms or sprinklers to go off during the quake.
- If you are outdoors, find a clear spot away from buildings, trees, and power lines. Drop to ground, but be alert to your surroundings.

Immediately after an earthquake:

- Remain calm and don't panic. Try to calm and reassure others. Stop and take time to think, wait until all motion has stopped.
- If you haven't already done so, shut down the IRA groundwater PAT system.
- Check others for injuries. Give first aid for serious injuries.
- Look for and extinguish small fires. Eliminate fire hazards.
- Expect aftershocks. Each time you feel one, drop, cover, and hold on. Inspect the facility for damage. Get everyone out of the facility if it is unsafe.
- Use the telephone only to report life-threatening emergencies.

3. Corrective Action/Operational Restoration

This section describes the actions personnel working at the Site must take in response to fires, explosion, or releases that threaten human health or the environment. This section includes the following:

- duties of all persons qualified to act as Emergency Coordinator
- coordination with local emergency agencies
- a description of emergency and spill-control equipment located at the Site
- the evacuation plan
- notification requirements for restarting the system
- locations for copies of this CP

A description of these items is presented below.

3.1 Designation of Emergency Coordinator

The Emergency Coordinator or their designees will be thoroughly familiar with all aspects of this CP, IRA groundwater PAT system operations and other activities at the Site, the location and characteristics of the untreated groundwater and other wastes handled at the Site, the location of records, and the layout of the Site.

The Emergency Coordinator or their designees is responsible for determining whether this CP needs to be implemented in response to an emergency incident. These persons have the authority to commit the resources necessary to carry out this CP. The Emergency Coordinator and their designees for the Site are listed in Table 1.

3.2 Coordination with Local Authorities

If the Emergency Coordinator or their designees determines that any incident at the Site threatens the health and safety of Site personnel, the community, or the environment, appropriate outside agencies will be notified, as necessary, to assist in emergency response activities. A list of these agencies and their phone numbers, including police, fire departments, and the local hospital, is included in Table 1. Also included on this list is FDEP, Manatee County Health Department (MCHD), and MCEMD contact information. This list will be posted near the telephone in the treatment building. The response agencies listed on Table 1 will be notified of the

facility layout, properties and hazards of the site, places where personnel are normally working, facility entrances and evacuation routes. Plans detailing the facility's layout and evacuation routes will also be displayed at the Site.

3.3 Emergency and Spill Control Equipment

The following is a list of emergency and spill control equipment that will be available during work activities to be conducted at the Site:

Name of Equipment	Location of Equipment	Capabilities/Limitations of Equipment
fire extinguishers (ABC rated)	Treatment building	ABC rated fire extinguishers are capable of putting out combustible materials, liquids, and electrical fires
telephone	Treatment building and personal cell phones	To be used in the event of an emergency to contact emergency response contacts. The plant telephone is limited to the integrity of area telephone lines. A cell phone is limited to the integrity of the cell phone coverage and its battery life.
Exclusion Zone – No Entry	Treatment building	Used to keep personnel out of dangerous areas
chemical spill kits for H_2SO_4 and NaOH	Treatment building	Capable of containing, neutralizing and cleaning up small spills
empty containers (i.e., 55 gallon drums, overpacks, and/or salvage drums)	Drum storage area at treatment building	Capable of containing and cleaning up small spills. Also, overpacks or salvage drums are capable of securing 55-gallon or smaller drums.
containment booms	Treatment building	Useful for containing spills but limited to small volumes

nitrile gloves and rubber boots	PPE cabinet in treatment building	Useful for protecting hands and feet from chemical burns
chemical-resistant overalls (i.e., Tyvek suits)	PPE cabinet in treatment building	Useful to protect clothing from chemical burns
Safety goggles, ear plugs, and hard hats	PPE cabinet in treatment building	Used to protect against falling objects and loud sounds
Brooms	Treatment building	Useful for cleaning dry chemical spills
Shovels	Treatment building	Useful for cleaning dry chemical spills
Sand bags	Stored in the covered area to the south of Building 3	To be used against flood waters

Following any emergency event, all emergency equipment will be cleaned, maintained, replaced or otherwise made fit for its intended use prior to resuming operations.

3.4 Evacuation Plan

The property is surrounded by a chain link fence. The main access road to the facility is through the gate at 1600 Tallevast Road. A parking area is located to the west and south of the Site buildings.

In the event of an emergency incident requiring evacuation of the Site, the main gate will serve as the assembly area. The signal for evacuation of the Site is three blasts of a horn (e.g., air horn or vehicle horn).

3.5 Notification System Ready for Start-Up

After the emergency has passed, the Emergency Coordinator or their designees will provide for treating, storing, or disposing of any recovered materials and/or contaminated soil or surface water generated during response to the emergency incident. Prior to resuming operations, the Emergency Coordinator or their designees will ensure that cleanup procedures and decontamination activities, if necessary, are complete, and that all emergency equipment is cleaned and restored to pre-accident

conditions. The Emergency Coordinator or their designees will notify the necessary agencies on Table 1 to declare the facility safe for continued operations.

3.6 System Start-Up

The RAP groundwater PAT will be restarted following procedures outlined in the Operation and Maintenance Manual.

3.7 Copies of Contingency Plan

Copies of this CP will be maintained in the operator's office, in the treatment building, in the Lockheed Martin project office and other locations specified by the Emergency Coordinator and their designees.

4. Preventative Action/Follow Up

Officials of the local response agencies will be contacted and briefed about IRA groundwater PAT system activities and potential emergencies during a Site walkthrough prior to start-up of the IRA groundwater PAT system.

5. Training

All facility personnel will be trained for evacuation and, according to their job functions, will be trained in implementation of this CP.

6. Amendment to the Contingency Plan

This CP is dynamic in nature and will be reviewed at least annually by the Emergency Coordinator and updated, as necessary. In addition this CP will be reviewed and amended, if necessary, whenever:

- applicable regulations are revised
- the plan fails in an emergency
- the facility changes in its design, construction, operations, maintenance, or other circumstances, or in a way that materially increases the potential for fires, explosions, or releases of hazardous waste or hazardous waste constituents in the response necessary for an emergency.

- the list of emergency equipment changes
- the list of emergency contact changes

ARCADIS

Tables

TABLE 1

FORMER AMERICAN BERYLLIUM COMPANY SITE
TALLEVAST, FLORIDA

EMERGENCY CONTACT LIST

Lockheed Martin Primary Emergency Coordinator - Tallevast	
Paul Calligan – Primary Emergency Coordinator	Office: 941.360.1843 Cell: 240.676.5392
Lockheed Martin Backup Emergency Coordinator - Tallevast	
Doug Foster – Backup Emergency Contact	Office: 941.360.1843 Cell: 813.416.7253
Other Lockheed Martin Emergency Contact	
Lockheed Martin Emergency Contact Number	800.449.7600
ARCADIS Emergency Contacts - Tallevast	
Darrin Johnson	Cell: 813.748.4874
John Perella	Office: 813.933.0697 Cell: 813.240.1605
Guy Kaminski	Office: 813.933.0697 Cell: 813.340.3869
FDEP Emergency Contacts - Tallevast	
William Kutash – Project Manager	Office: 813.632-7600
Other - Emergency Contacts	
Local Police (Sheriff)	911 or 941.861.5800
State Police	911 or 941.359.5655
Local Ambulance (Tallevast)	911 or 941.751.7675
Local Fire Department (Southern Manatee Fire Department)	911 or 941.751.7675
Local Hospital (Sarasota Memorial Hospital)	911 or 941.917.9000
Electric Company (FPL – Larry Russo)	800.375.5566
Poison Control (Florida Poison Information Center – Tampa)	800.222.1222
Manatee County Health Department	941.748.0747 Ext 1340
Florida Department Of Health	850.245.4250
Manatee County Environmental Management Department	941.742.5980
FDEP – State Warning Point Spill Hotline	800.320.0519
National Response Center (all spills in reportable quantities)	800.424.8802
USEPA – Emergency Response Team	800.424.8802

TABLE 1

FORMER AMERICAN BERYLLIUM COMPANY SITE
TALLEVAST, FLORIDA

EMERGENCY CONTACT LIST

Other Contacts	
Waste Disposal Contractor (SWS First Response – Eric Cooper)	Cell: 727.224.6952 24 Hour Emergency: 800.852.8878
Well Contractor (Precision Drilling – Raymond Aldace)	Office: 407.880.1002
Computer Programming Contractor (Purifics – Tony Powell)	Office: 519.473.5788
Mechanical Contractor (ERC –Mike Anders)	Office: 407.468.1181
Electrical Contractor (JHHAM – Steve Meirer)	Office: 863.646.1448

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Figures

CITY: SYRACUSE DIV/GROUP: 141/DIV DB: LJP LD: LJP PIC:(Opt) PM: D.SAUDA TM: R.GANG LYR:(Opt)ON=*;OFF=*REF*
G:\CAD\ACT\B0038063\0000\00001\MAP\REPORT\AKRON\38063B02.dwg LAYOUT: 1SAVED: 9/15/2008 1:54 PM ACADVER: 17.0S (LMS TECH) PAGESETUP: ----PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 9/15/2008 2:28 PM BY: POSENAUER, LISA
XREFS: IMAGES: PROJECTNAME: ----
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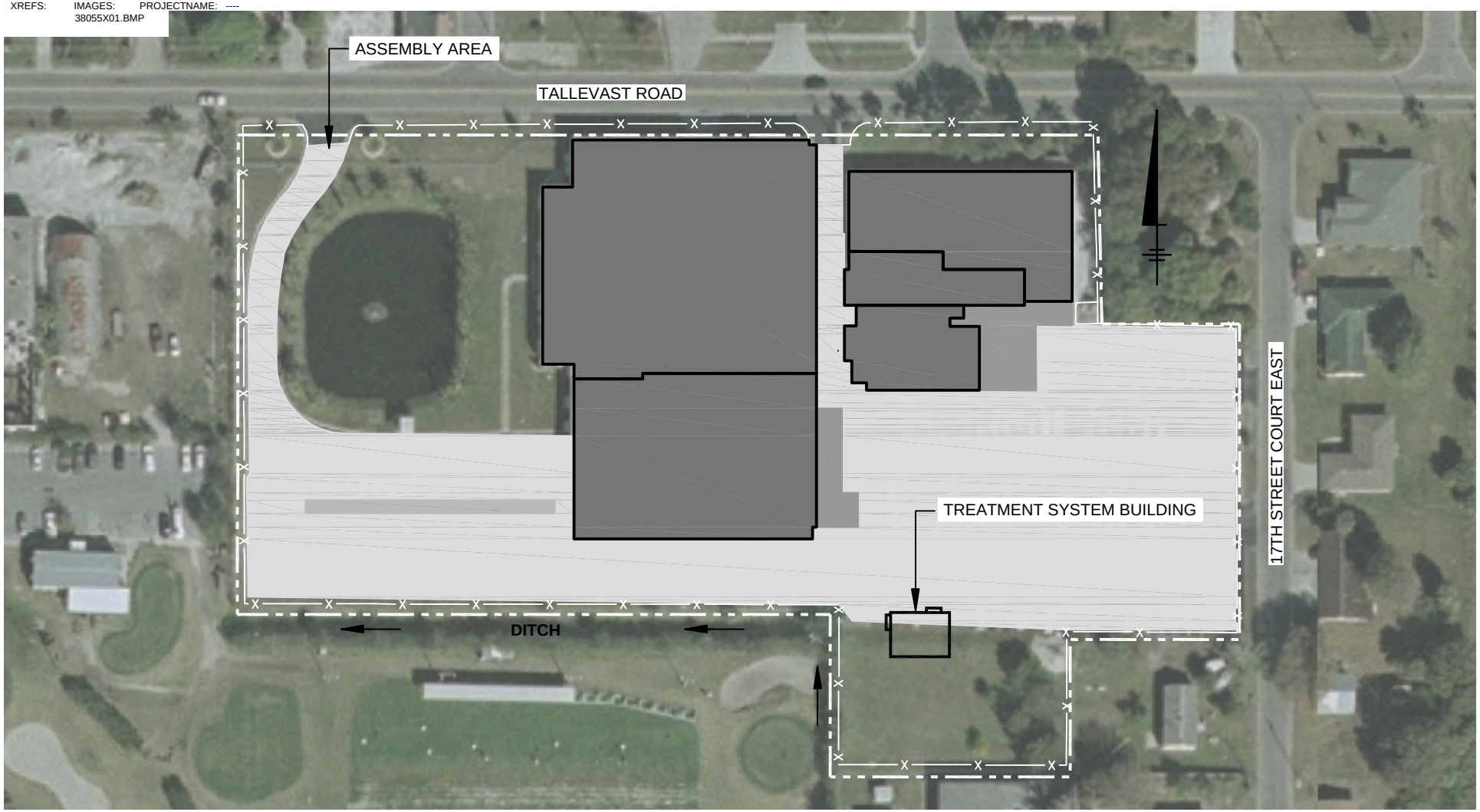

LEGEND:

SITE BOUNDARY

FENCE

NOTE:

BASE MAP INFORMATION OBTAINED FROM A TETRA TECH, INC. FIGURE 2-8 ENTITLED "TCE IN SURFICIAL AQUIFER SYSTEM BASED ON SCREEN POINT SAMPLING AT THE BASE OF THE SURFICIAL AQUIFER" DATED 10/5/04, AT A SCALE OF 1"=280'.

0 80' 160'

GRAPHIC SCALE

FORMER AMERICAN BERYLLIUM COMPANY SITE
TALLEVAST, FLORIDA

SITE PLAN

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FIGURE
1

FIGURE 2
MAP TO HOSPITAL

Route to the Hospital

The directions to the nearest medical facility (**Sarasota Memorial Hospital**) which is about 6.5 miles away are given below and shown on the attached map.

- From the Tallevast site area - Head east on Tallevast Road to Highway 301 and turn right;
- Proceed south on Highway 301 for 5.1 miles which turns into Route 41 Tamiami Trail;
- Continue south on Tamiami Trail for another 0.8 miles to the Sarasota Memorial Hospital; and
- Hospital is on the right hand side at 1700 South Tamiami Trail.