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NWIRP CALVERTON NY
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Halliburton NUS CORPORATION

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C-49-08-4-273

August 23, 1994

Mr. David Pratt
New York State Department of Environmental Conservation
50 Wolf Road
Room 208
Albany, New York 12233-7010

Reference: Contract No. N62472-90-D-1298, CTO No. 0138

Subject: Request for Approval to Conduct Pump Tests
NWIRP Calverton, New York

Dear Mr. Pratt:

As discussed, please find enclosed a summary of the proposed pump test activities to be conducted at the NWIRP, Calverton. These activities are being performed as part of the RCRA Facility Investigation for this facility. We believe that the summary presented in Attachment 1 provides the data that you requested. Attachment 2 is provided for your general information.

Pending your review and approval of the proposed activities (attached), the groundwater extraction and treatment components will be used to extract and treat approximately 2,000 gallons of groundwater. This water will be containerized pending test results. This initial test is tentatively planned for the week of September 5, 1994.

During this test, the treatment system influent and effluent water will be sampled and analyzed for VOCs. Analytical results will be submitted to you approximately one week later. Pending successful testing, we will request approval to conduct the 24- to 48-hour pump test, (tentatively scheduled for the week of September 19, 1994).

If have any questions or require additional information, please contact Mr. Colter at (610) 595-0567, extension 163 or me at (412) 921-8375.

Sincerely,

David D. Brayack, P.E.
Project Manager

/DDB

cc: Mr. R. Boucher (Navy) w/o attachment
Mr. J. Colter (Navy)
Mr. D. Rule (Navy) w/o attachment
Mr. J. Trepanowski (HNUS)
Ms. D. Wroblewski (HNUS) w/o attachment
Ms. J. Farrell (HNUS) w/o attachment
File: 0206

ATTACHMENT 1
RFI - PUMP TEST SUMMARY
NYSDEC REQUESTED INFORMATION
NWIRP, CALVERTON

The Navy is conducting a RCRA Facility Investigation (RFI) at the NWIRP Calverton. The objective of the RFI is to determine the nature and extent of contamination at four sites. As part of this investigation, the Navy is planning to conduct pump tests at two former groundwater extraction units (fire training area and fuel calibration area). The purpose of the pump tests is to measure hydrogeological parameters at the facility and to determine the potential effectiveness of the existing system in containing groundwater contamination. The pump tests are planned for September/October 1994.

Available historic information on the existing pump systems can be found in the Navy's 1991 Site Investigation Report, a letter report summarizing the Navy's sampling efforts in July 1992 (10/07/94), and Grumman Spill Reports. The groundwater systems operated from 1988 to July 1992. In 1992, the state ordered the systems shut down. Just prior to shutdown, the Navy collected samples of the water being extracted from the wells. This data is presented in the Table 2 of Attachment 2. Based on this data, as well as other data collected during a Site Investigation in 1991, the groundwater is expected to be contaminated with chlorinated solvents and fuel-type volatile organics (e.g. ethylbenzene and xylene). Semivolatile organics and PCBs/pesticides have been detected at one of the sites.

Also of note is the presence of iron and manganese in the groundwater at the fuel calibration area. Based on the concentration and area, the iron and manganese are suspected to be of natural origin. However, site data is not available to support this belief. Iron is a common constituent in area soils, with a background soil iron concentration of approximately 11,000 mg/kg. In addition, the area is being investigated because of historic fuel and solvent spills. Inorganic contamination (except possibly for lead in fuels) would not be expected at this site.

The planned pump test activities are summarized as follows. Additional details on the planned pump tests are presented in Attachment 2.

1) Construct a groundwater extraction, treatment, and spray irrigation discharge system at the fire training area. Components of the system are as follows.

   - 4" submersible pump and associated piping.
   - Bag filter.
   - Two 350-gallon activated carbon units.
   - Water buffalo (~2500 gallons).
   - Discharge pump.
   - 1000 feet of discharge piping.
   - Spray irrigation units (ground infiltration).

2) Conduct a preliminary test of the system to evaluate the effectiveness of the activated carbon unit. The activated carbon is expected to reduce the concentration of organics to less than MCLs and potentially below detectable limits (MDLs). Removal of inorganics by the system would not be expected. Approximately 2000 gallons will be pumped through the treatment system at a rate of about 60 gpm. The water will be discharged to a 2500-gallon holding tank. During the preliminary test, one sample of the treatment system influent and three samples of the discharge water (after carbon treatment, but prior to the tank) will be collected and tested for VOCs. Results will be available approximately one week after testing.

3) Submit the results to the state and request approval from the state to conduct the pump test.

4) Upon approval from the state, conduct the pump test at the fire training area. Each pump test will consist of the following steps.

   - Conduct step drawdown tests with flowrates varying from 15 gpm to a maximum of 60 gpm. The water will be treated with activated carbon and discharged via spray irrigation. Total volume of water is estimated to be approximately 15,000 gallons.

   - Conduct a 24- to 48-hour pump test at a maximum rate of 60 gpm. This water will be treated with activated carbon units and discharged via spray irrigation. The maximum volume of water to be discharged over two days is 180,000 gallons.

   - Samples of the extraction well water and of the treated discharge water will be collected every 12 hours. The samples will be analyzed for VOCs.

5) Relocate the extraction and treatment system to the fuel calibration area and repeat steps 2 through 4.

ATTACHMENT 2
RFI - PUMP TEST DETAILS
NWIRP, CALVERTON

ATTACHMENT 1
RFI - PUMP TEST SUMMARY
NYSDEC REQUESTED INFORMATION
NWIRP, CALVERTON

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Available historic information on the existing pump systems can be found in the Navy's 1991 Site Investigation Report, a letter report summarizing the Navy's sampling efforts in July 1992 (10/07/94), and Grumman Spill Reports. The groundwater systems operated from 1988 to July 1992. In 1992, the state ordered the systems shut down. Just prior to shutdown, the Navy collected samples of the water being extracted from the wells. This data is presented in the Table 2 of Attachment 2. Based on this data, as well as other data collected during a Site Investigation in 1991, the groundwater is expected to be contaminated with chlorinated solvents and fuel-type volatile organics (e.g. ethylbenzene and xylene). Semivolatile organics and PCBs/pesticides have been detected at one of the sites.

Also of note is the presence of iron and manganese in the groundwater at the fuel calibration area. Based on the concentration and area, the iron and manganese are suspected to be of natural origin. However, site data is not available to support this belief. Iron is a common constituent in area soils, with a background soil iron concentration of approximately 11,000 mg/kg. In addition, the area is being investigated because of historic fuel and solvent spills. Inorganic contamination (except possibly for lead in fuels) would not be expected at this site.

The planned pump test activities are summarized as follows. Additional details on the planned pump tests are presented in Attachment 2.

1) Construct an groundwater extraction, treatment, and spray irrigation discharge system at the fire training area. Components of the system are as follows.

   - 4" submersible pump and associated piping.
   - Bag filter.
   - Two 350-gallon activated carbon units.
   - Water buffalo (~2500 gallons).
   - Discharge pump.
   - 1000 feet of discharge piping.
   - Spray irrigation units (ground infiltration).

2) Conduct a preliminary test of the system to evaluate the effectiveness of the activated carbon unit. The activated carbon is expected to reduce the concentration of organics to less than MCLs and potentially below detectable limits (MDLs). Removal of inorganics by the system would not be expected. Approximately 2000 gallons will be pumped through the treatment system at a rate of about 60 gpm. The water will be discharged to a 2500-gallon holding tank. During the preliminary test, one sample of the treatment system influent and three samples of the discharge water (after carbon treatment, but prior to the tank) will be collected and tested for VOCs. Results will be available approximately one week after testing.

3) Submit the results to the state and request approval from the state to conduct the pump test.

4) Upon approval from the state, conduct the pump test at the fire training area. Each pump test will consist of the following steps.

   - Conduct step drawdown tests with flowrates varying from 15 gpm to a maximum of 60 gpm. The water will be treated with activated carbon and discharged via spray irrigation. Total volume of water is estimated to be approximately 15,000 gallons.

   - Conduct a 24- to 48-hour pump test at a maximum rate of 60 gpm. This water will be treated with activated carbon units and discharged via spray irrigation. The maximum volume of water to be discharged over two days is 180,000 gallons.

   - Samples of the extraction well water and of the treated discharge water will be collected every 12 hours. The samples will be analyzed for VOCs.

5) Relocate the extraction and treatment system to the fuel calibration area and repeat steps 2 through 4.

ATTACHMENT 2
RFI - PUMP TEST DETAILS
NWIRP, CALVERTON

1.0 PUMPING TEST PLAN FOR SITE 2 (FIRE TRAINING AREA) AND SITE 6A (FUEL CALIBRATION AREA)

The objective of the pumping tests at Site 2 and Site 6a is to quantify the hydraulic characteristics of the shallow portion of the upper glacial aquifer in the vicinity of these sites. The pumping tests are intended to provide information regarding the following:

- Transmissivity and storativity of the shallow portion of the upper glacial aquifer.
- Cross-formational (vertical) anisotropy.
- The test results will be used to determine the effectiveness of the existing groundwater recovery systems for capturing dissolved-phase contaminants. In addition, data will be used to determine the local hydraulic conditions of Site 2 and Site 6a.

2.0 PUMPING / OBSERVATION WELL NETWORK

At both Site 2 and Site 6a the existing groundwater extraction wells will be pumped during the long term (2 day) pumping test. A number of monitoring wells near these recovery wells will be used as observation wells for the aquifer tests. The flow rates to be used during the pumping tests will be determined after completion of the step-drawdown testing.

2.1 SITE 2 (FIRE TRAINING AREA)

The pumping well for the Site 2 pumping test will be the recovery well located east of the fire pit, north of the access road. This well is a 4-inch PVC groundwater pumping well and a 4-inch product recovery well. The groundwater recovery well is located in a manhole with the product recovery well located approximately 5 feet from the groundwater recovery well. This system is enclosed within a locked fence. Currently, a submersible pump is present in the well which is connected to 2-inch PVC piping. It is unknown if this pump is operational. The estimated yield of this well is unknown, although the pumping rate for the recovery system has been reported to be between 30 and 60 gpm. The well was last reported to have been pumped in 1992 at which time the flow rate from the pump was 34.5 gpm. The depth of the groundwater recovery well is approximately 46 feet. The water level in the well is approximately 10 ft below ground surface.

A number of nearby observation wells will be monitored during the pumping test. The following are the primary monitoring well that will be monitored.

Wells 1, 8 and 9 (installed by Marine Pollution Control, Inc.) are shallow wells which will be monitored for drawdown during the pumping test. These wells are less than 60 feet from the pumping well and will provide information on water elevations in the immediate area around the pumping well. In addition, five monitoring wells recently installed by HNUS will be monitored for changes in water level. The shallow well at FT-MW-04-S and the shallow and intermediate wells at FT-MW-01 and FT-MW-02 will be monitored. These wells range in distance from 75 to 375 feet from the pumping well and will provide information on drawdowns at increasing distance from the pumping well at shallow and intermediate depths.

In addition to the primary monitoring well network, a number of wells located further away from the test site will be monitored periodically for drawdowns. These wells include the shallow well FT-MW-03-S (located 535 ft from the pumping well) and the shallow and intermediate wells at FT-MW-05-S, I and FT-MW-06-S, I (located 560 and 535 ft from the pumping well).

The Site 2 pumping test layout is shown in Figure 1.

2.2 SITE 6A (FUEL CALIBRATION AREA)

The pumping well for the Site 6a pumping test will be the groundwater recovery well located west of the access road, east of well FC-MW-02.. This well is a 4-inch PVC groundwater pumping well and the associated 4-inch product recovery well. The groundwater recovery well is located approximately 6 feet from the pumping well. This system is enclosed within a locked fence. Currently, a submersible pump is present in the well which is connected to 2-inch PVC piping. It is unknown if this pump is operational. The estimated yield of this well is unknown, although the pumping rate for the recovery system has been reported to be between 30 and 60 gpm. Water pumped from the well was pumped to a drainage culvert which flows to a marshy area approximately 1,500 ft south of the well. The well was last reported to have been pumped in 1992 at which time the flow rate was not determined. The depth of the groundwater recovery well is approximately 40 feet. The water level in the well is approximately 5 ft below ground surface.

A number of nearby observation wells will be monitored during the pumping test. The following are the primary monitoring well that will be monitored.

Wells 3 and 13 (installed by Marine Pollution Control, Inc.) are shallow wells which will be monitored for drawdown during the pumping test. The shallow well FC-MW-03-S will also be monitored. These wells are less than 70 feet from the pumping well and will provide information on water elevations in the immediate area around the pumping well. In addition, four monitoring wells recently installed by HNUS will be monitored for changes in water level. The shallow and intermediate wells at FC-MW-02 and FT-MW-04 will be monitored. These wells range from 120 to 250 feet from the pumping well and will provide information on drawdowns at increasing distance from the pumping well at shallow and intermediate depths.

In addition to the primary monitoring well network, a number of wells located further away from the test site will be monitored periodically for drawdowns. These wells include the shallow and intermediate wells at FC-MW-01-S, I (located 500 ft from the pumping well) and FC-MW-05-S, I (425 ft from the pumping well).

The Site 6a pumping test layout is shown in Figure 2.

3.0 STEP-DRAWDOWN TESTING

Prior to performing the long-term pumping test, a step-drawdown test will be performed to set the pumping rate for the long-term test. In addition, the contaminant levels in the discharge water will be tested to assure that the treatment system is functioning properly. Prior to beginning the step drawdown test water levels will be measured in the pumping well cluster and in the surrounding primary observation well clusters, to provide comparison points for subsequent readings. At both sites the groundwater recovery well will be pumped, using a submersible pump, for short (100-minute) time periods at successively higher rates until the drawdown rate exceeds the well's yield capacity (approximately 60 gpm).

The initial pumping rate will be approximately 15 gpm. The pumping rate will be increased in approximately 15 gpm intervals until the rate exceeds the projected long-term yield capability of the well (maximum flow of 60 gpm). A totalizing flow meter will be used to measure flow rates, with a calibrations on the holding tank and stopwatch used also used to check the flow meter readings.

During each step of the step drawdown test, water levels will be monitored in the primary monitoring well locations. A data logger and pressure transducer set to the log cycle reading frequency will be used to monitor the drawdown in the pumping well, with periodic hand measurements also obtained to provide a check of the transducer data. The network of secondary observation wells will be checked every 20 minutes for drawdown.

The time-drawdown data for the pumping well will be recorded on pumping test data sheets and graphed on semi-log paper as the test progresses, to determine the drawdown rates and project long-term drawdowns at the various pumping rates. Observation well data will be evaluated to determine the degree of drawdown occurring in response to the pumping. This data will be used to evaluate whether the anticipated pumping rate will result in observed drawdowns in the nearby wells.

Water pumped during the step-drawdown and long-term pumping tests will be routed through a bag filter to remove suspended solids and then through activated carbon filters for treatment. Water will be containerized in a 2,500 gallon holding tank before being pumped to the discharge sprinkler system.

Prior to the step drawdown test a flourosilicate gel will be applied to all pressure transducers which will be located in areas which may contain free-phase product. This gel will prevent the loss of integrity of the transducer seal and will not effect the accuracy of the transducer. The gel will be applied according to manufacturers instructions.

4.0 LONG-TERM PUMPING TEST

The long-term pumping test is designed to be run for a maximum of 48 hours. The test may be terminated prior to the full 48-hour duration if steady-state drawdown conditions are reached in the pumping and observation wells or if changing field conditions make the data obtained from further testing of highly questionable usefulness (i.e., a sustained rainfall event occurs that causes significant water level changes in the wells). Every effort will be made to schedule the test during a time period when no significant precipitation is anticipated, to avoid precipitation-related complications. At the conclusion of the active pumping phase of the test, recovery measurements will be taken in all observation wells in which significant drawdowns were observed, for a period of 12 to 24 hours.

The long-term pumping test will be run as a constant rate test, using the pumping rate selected based on the step-drawdown test. Samples of the extraction well water and of the treated discharge water will be collected every 12 hours to assure the quality of water being discharged. Samples will be analyzed for VOCs and will be sent for quick turn around analysis.

Trend Measurements

Trend data will be collected from the pumping well and the primary observation wells, for a period of 48 hours prior to begin the pumping test. This trend data may provide backup trend projection capabilities in the event that a precipitation event occurs during or immediately following the pumping test that would render the static water level based projections invalid. At a minimum, the trend measurements will be obtained at using pressure transducers placed in the primary monitoring wells. Precipitation readings will be recorded during the same 48-hour period over which trend measurements are taken.

Pre-pumping static water levels in the wells will be compared against post-pumping static water levels, and a straight-line trend projection made based on the water levels before and after the test. This extrapolated trend data will be applied to the drawdown data as necessary. The application of this trend correction technique requires that no significant precipitation events occur between the pre- and post-pumping test static water level measurements.

Pumping Test Setup

Immediately prior to beginning the pumping test, a round of water levels will be obtained from the pumping well and all observation wells. For those wells that are to be monitored with pressure transducers, the transducers will be set in the well at a depth below the maximum anticipated drawdown level due to pumping. The pump will be setup in the pumping well below the anticipated maximum drawdown level due to pumping. The discharge line from the pump will be connected to a ball valve (for controlling the discharge rate) and the flow meter, then the line will be run from the flow

meter through a bag filter which will remove fine particles and suspended solids. A sampling port will be installed in the discharge line at a point between the flow meter and the bag filter. Water will be pumped through activated carbon canisters into a 2,500 gallon holding tank. A surface pump will move water from the holding tank to the discharge sprinklers. Water discharge lines will be extended out from the canisters approximately 1,000 ft away from the test area. A schematic of the water discharge line layout is presented in Figure 3. Electrical power will be obtained from a portable generator if no power source is available nearby.

Distances from the pumping well to each of the observation wells, and the orientation (i.e., compass direction) of each observation well relative to the pumping well will be field measured and recorded on pumping test data sheets.

At both sites, the discharge system will be set up and tested before beginning the step drawdown test by pumping approximately 2,000 gallons of water from the well into the holding tank. One sample will be collected from the treatment system inflow for TCL VOCs. Three samples will be collected from the system after the carbon canisters at evenly spaced time intervals to determine the effectiveness of the activated carbon treatment system. These samples will be sent to a fixed-based analytical laboratory for quick turn around analysis. Results will be available approximately one week after sampling. The step drawdown test will be conducted pending the results of these samples show the carbon treatment has reduced contaminant levels to acceptable levels for discharge (MCLs).

Pumping Test Performance

Immediately upon starting the pump for the long-term pumping test, water level readings will be obtained from the pumping and observation wells. For the primary observation wells at least 10 water level readings will be obtained per log cycle of time, i.e., 10 readings during the first 10 minutes of the test 10 readings during the time period from 10 to 100 minutes, etc. For the primary observation wells monitored using pressure transducers and data loggers, the log cycle data recording option will be utilized.

Water level readings will be obtained from the secondary observation wells at reduced frequencies. It is anticipated that water levels will initially be obtained at 20-minute time intervals from these wells for the first 2 hours with the frequency of readings decreasing to hourly for the next 4 hours then every 4 hours for the remainder of the test. Wells that show responses to pumping may be monitored more frequently than described above, at the discretion of the field hydrogeologist.

Drawdown data from the pumping and observation wells will be field plotted on semi-log graph paper as the test progresses. The field data plots will be used to evaluate drawdown trends, look for boundary conditions, project drawdowns for the latter stages of the test, and to determine whether steady-state drawdown conditions have been reached. Field personnel will be in frequent communication with senior technical personnel to provide updates of the test progress. Precipitation will be continually

recorded throughout the test using a rain gauge located near the pumping well.

Flow rate measurements will be obtained throughout the pumping test. During the startup phase, pumping rates will be constantly monitored until the flow is stabilized at the desired rate. Following flow rate stabilization, flow measurements will be recorded at least every 10 minutes for the first 100 minutes of the test, at least every 20 minutes for the next 100 minutes and at least hourly for the remaining duration of the test. Both the flow rate at the time of measurement and the total number of gallons pumped from the start of the test to the time of measurement will be recorded. A variance in flow rate of no more than 5 percent will be considered acceptable for the test.

The flow rate measurements will be obtained from a totalizing flow meter. As a check of the flow meter, calibration on the holding tank and stopwatch will be used to check the flow rate periodically.

Recovery Measurements

At the conclusion of the active pumping portion of the test, the pump will be shut off and recovery measurements will be obtained from the pumping well and the observation wells where significant drawdowns were observed, for a period of up to 24 hours. The frequency of readings will be the same as for the start of the pumping test, i.e., water levels will be taken at log cycle frequencies. In addition, rounds of water levels will be obtained from the pumping and observation wells approximately 24 and 48 hours after the conclusion of the pumping test.

5.0 DATA EVALUATION

The drawdown data obtained from the wells monitored during the test will be evaluated to determine aquifer characteristics. Prior to analysis, the data will be corrected for trend. It is not anticipated that dewatering or partial penetration corrections will be required, however they will be applied if necessary. The corrected data will be plotted on both semilog and log-log graph paper and analyzed using appropriate data analysis methods. Both time-drawdown and distance-drawdown methods will be considered for use, with final selection of the analysis methods made based a review of the data plots and hydrogeologic conditions.

FIRE TRAINING AREA (SITE 2) PUMPING TEST

Estimated flow rate of 35 to 60 gpm.
Estimated duration of pumping test is 36 to 48 hours.
Estimated duration of recovery period is 24 hours.
Trend data to be recorded for 48 hours prior to test.

WELL [1]	DISTANCE FROM PUMPING WELL (ft)	MEASURING DEVICE	PRIMARY / SECONDARY
Pumping Well (Recovery Well)	--	Pressure Transducer	Primary
1	15	Pressure Transducer	Primary
8	35	Pressure Transducer	Primary
9	45	Pressure Transducer	Primary
FT-MW-04-S	110	Pressure Transducer	Primary
FT-MW-01-S	375	Pressure Transducer	Primary
FT-MW-01-I	385	Pressure Transducer	Primary
FT-MW-02-S	80	Pressure Transducer	Primary
FT-MW-02-I	78	Pressure Transducer	Primary
FT-MW-05-S	560	Hand Measured	Secondary
FT-MW-05-I	560	Hand Measured	Secondary
FT-MW-06-S	535	Hand Measured	Secondary
FT-MW-06-I	535	Hand Measured	Secondary
FT-MW-03-S	535	Hand Measured	Secondary

(1) The pumping Well is screened from approximately 30 to 45 feet below ground. Shallow wells are screened less than 25 feet below ground. Intermediate wells are screened at approximately 45 to 55 ft below ground.

FUEL CALIBRATION AREA (SITE 6A) PUMPING TEST

Estimated flow rate of 35 to 60 gpm.
Estimated duration of pumping test is 36 to 48 hours.
Estimated duration of recovery period is 24 hours.
Trend data to be recorded for 48 hours prior to test.

WELL [1]	DISTANCE FROM PUMPING WELL (ft)	MEASURING DEVICE	PRIMARY / SECONDARY
Pumping Well (Recovery Well)	–	Pressure Transducer	Primary
3	15	Pressure Transducer	Primary
13	35	Pressure Transducer	Primary
FC-MW-03-S	68	Pressure Transducer	Primary
FC-MW-02-S	150	Pressure Transducer	Primary
FC-MW-02-I	150	Pressure Transducer	Primary
FC-MW-04-S	255	Pressure Transducer	Primary
FC-MW-04-I	255	Pressure Transducer	Primary
FC-MW-01-S	500	Hand Measured	Secondary
FC-MW-01-I	500	Hand Measured	Secondary
FC-MW-05-S	425	Hand Measured	Secondary
FC-MW-05-I	425	Hand Measured	Secondary
FC-MW-06-S	375	Hand Measured	Secondary

(1) The pumping Well is screened from approximately 25 to 40 feet below ground. Shallow wells are screened less than 25 feet below ground. Intermediate wells are screened at approximately 45 to 55 ft below ground.

PRELIMINARY SCHEDULE FOR PUMPING TESTS AT FIRE TRAINING AREA (SITE 2) AND FUEL CALIBRATION AREA (SITE 6A)

Prior to step drawdown test:

- Set up pumping and discharge system. Test system by pumping approximately 2,000 gallons into holding tank. Sample water from well and after carbon canisters to determine effectiveness of treatment system. Samples will be sent for quick turn around analysis.

Friday:

- Measure distances to all observation wells from pumping well.
- Complete round of water levels in all wells.
- Set up pressure transducers in primary wells and record trend data for 48 hours.

Weekend:

- Record trend from primary wells data using pressure transducers.

Monday:

- Conduct step-drawdown test at four pumping intervals (15, 30, 45 and 60 gpm). Record effects on pumping well and nearby observation wells.
- Determine necessary pumping rate for test based on step-drawdown results.

Tuesday:

- Program data loggers in primary wells for log-cycle recording mode.
- Start pumping test at rate determined during step-drawdown test.
- Periodically measure water levels in primary and secondary wells by hand.
- Sample water before and after carbon treatment system every 12 hours.

Wednesday:

- Periodically measure water levels in primary and secondary wells by hand.
- Stop pump after steady-state conditions are reached (estimate 36 to 48 hours).
- Record recovery data in primary wells using pressure transducers recording on log cycle.
- Periodically measure water levels in primary and secondary wells by hand.

Thursday:

- Periodically measure recovery data in primary and secondary wells by hand.
- Stop recording recovery data after 90% of static water elevations are reached (estimate 24 hours).
- Move data loggers to primary wells at Fuel Calibration Site.
- Move discharge system to Fuel Calibration Site. Set up discharge system at Fuel Calibration site.

Friday:

- Schedule will continue as listed for the Fire Training Area pumping test.

TABLE 2

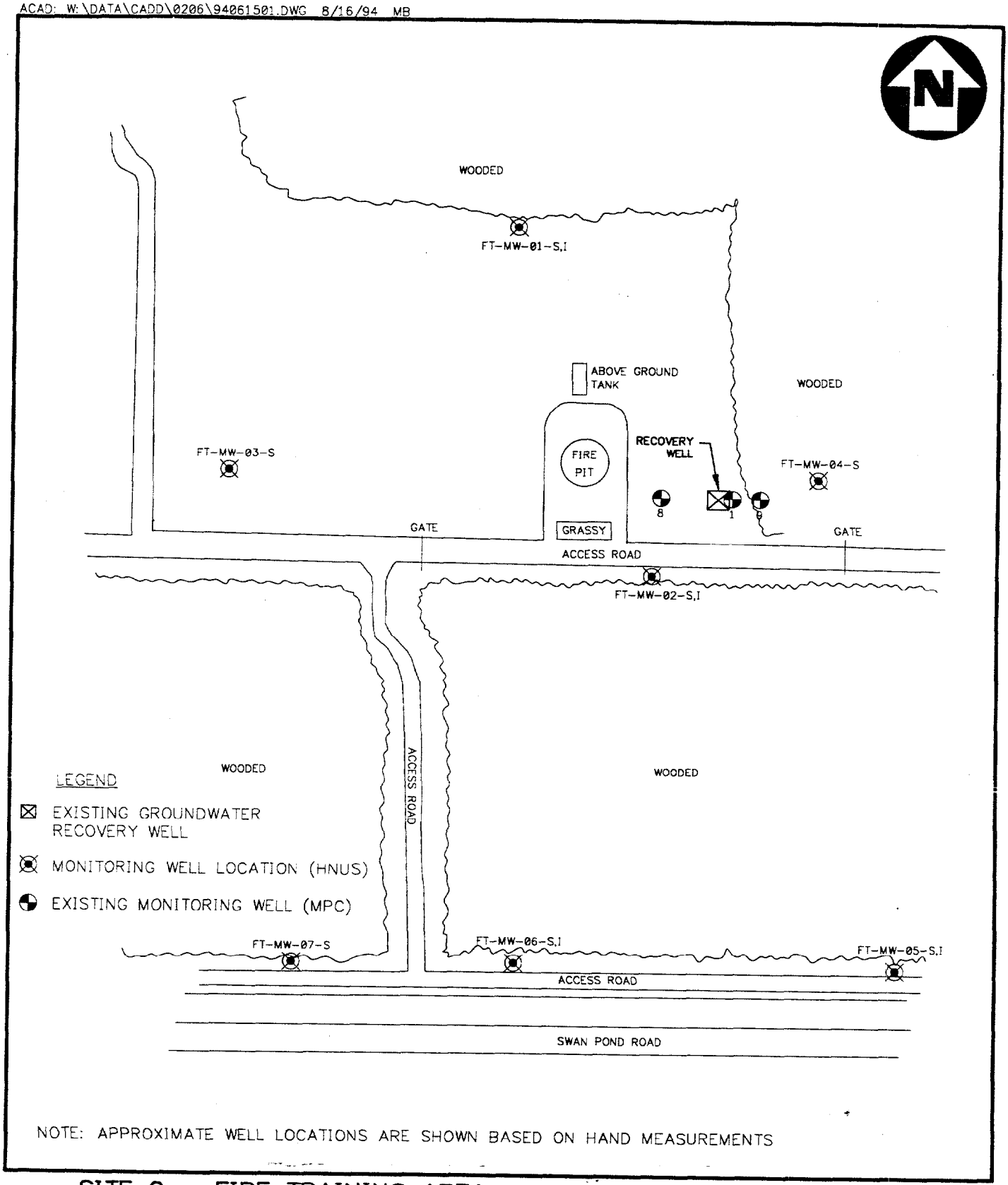
RESULT OF ANALYSIS (ug/l)
GROUNDWATER EXTRACTION SYSTEMS
NWIRP, CALVERTON, NEW YORK

Constituent	Method Detection Limits	Fire Training Area				Fuel Calibration Area				Federal/ NYS Drinking Water Standard (ug/l)
Sample Date		07/07/92	07/07/92 Duplicate	07/16/92	07/20/92	07/07/92	07/16/02	07/20/92	07/20/92 Duplicate	
Sample Number		FT-GWR-01	FT-GWR-01D	FT-GWR-02	FT-GWR-03	FC-GWR-101	FC-GWR-102	FC-GWR-103	FC-GWR-103D	
Chloroethane	*/3.09[I]					68[L]	77[K]	76[L]	74[L]	-/5
Acetone	*/4.02[I]								4DJ[L]	-/50
1,1-Dichloroethene	*/2.11[I]					7J[L]	8J[K]	9J[L]	9J[L]	7/5
1,1-Dichloroethane	*/1.97[I]	2J[L]	2J[L]	2J[K]	2J[L]	220[L]	250[K]	240D[K]	230D[L]	-/5
2-Butanone	*/1.49[I]							32D[K]		-/50
1,1,1-Trichloroethane	*/2.55[I]	3J[L]	3J[L]	3J[K]	3J[L]	210[L]	220[K]	220D[K]	210D[L]	200/5
Benzene	*/1.32[I]							2J[L]	2J[L]	5/5
Toluene	*/1.52[I]					6J[L]	5J[K]	7J[L]	7J[L]	1000/5
Ethylbenzene	*/2.01[I]					12J[L]	13J[K]	16[L]	16J[L]	700/5
Xylene	*/4.19[I]					89Y[L]	80Y[K]	100Y[L]	98Y[L]	10000/5
Volatile TICs						+	+		+	-/-
4-Methylphenol	3.93					1J	1J			-/50
1,2,4-Trichlorobenzene	2.36					4J	3J	3J	2J	70[3]/5
2-Methylnaphthalene	3.38					1J	1J	3J	2J	-/50
bis(2-ethylhexyl)Phthalate	8.83						1J			6[3]/50
Semi-VOA TICs				+	+	+	+	+	+	-/-
Endrin aldehyde	0.013	0.0042JP				NA	NA	NA	NA	2/0.2
gamma-BHC	0.013			0.014JP		NA	NA	NA	NA	0.2/4
Aluminum	20	294	268	296	262					50 to 200/-

Constituent	Method Detection Limits	Fire Training Area				Fuel Calibration Area				Federal/ NYS Drinking Water Standard (ug/l)
Sample Date		07/07/92	07/07/92 Duplicate	07/16/92	07/20/92	07/07/92	07/16/02	07/20/92	07/20/92 Duplicate	
Sample Number		FT-GMR-01	FT-GMR-01D	FT-GMR-02	FT-GMR-03	FC-GMR-101	FC-GMR-102	FC-GMR-103	FC-GMR-103D	
Calcium	20					10,900	11,000	11,000	11,100	-/-
Copper	3					42				1300/1000[3]
Iron	25					3,860	3,880	3,770	3,800	300/300
Lead	2				3.6	9.8	3.90	3.1	4.2	50[4]/50
Manganese	1	57.8	56	56.1	56.3	149	145	143	144	50/300[3]
Sodium	80					10,000	10,000			-/-
Zinc	2	30.3	39.6	45.1			29.5			5,000/5,000[3]
Cyanide	1				11.4	NA	NA	NA	NA	200/-
Alkalinity (mg/l)	NA	6	NA	5	6	30	26	28	NA	-/-
BOD_5 (mg/l)	NA	<4.6	NA	<2.0	<1.6	<4.6	<2.0	<2.0	NA	-/-
TDS (mg/l)	8.78	69	NA	43	45	170	110	86	NA	-/-
TSS (mg/l)	6.8	<7	NA	<7	<7	<7	<7	<7	NA	-/-
TPH (mg/l)	NA	<2	NA	<2	<2	<2	<2	<2	NA	-/-

Blank: Indicates that constituent was not found at a concentration above the detection limit; or was measured to be above the detection limit but was qualified with a B, indicating constituent was also found at a similar concentration in the blank sample.
J: Laboratory qualifier for estimated.
P: Laboratory qualifier indicating poor comparison of results found between first and second columns confirmation.
Y: Laboratory qualifier referencing analytical backup package.
D: Duplicate sample or result.
+: Tentatively Identified Compounds present.
*: MDLs are not available for Instrument L, see footnote 1.
NA: Not Analyzed.
-: No standard.
L: VOA was performed on instrument L, see footnote 1.
K: VOA was performed on instrument K, see footnote 1.
1: VOA samples were analyzed on two instruments, Instrument L and Instrument K. The MDLs for Instrument K are presented in the MDL column with the format of "*"/"Instrument K MDLs". The "*" indicates that MDLs are not available for instrument L.
2: Effective 1/7/94.
3: Secondary MCLs.
4: NPDWR effective until 11/09/92. Action level for public water supplies is 15 ug/l.

ACAD: W:\DATA\CADD\0206\94061501.DWG 8/16/94 MB



NOTE: APPROXIMATE WELL LOCATIONS ARE SHOWN BASED ON HAND MEASUREMENTS

SITE 2 – FIRE TRAINING AREA
PERMANENT MONITORING WELL LOCATIONS
NWIRP, CALVERTON NEW YORK

0 150 300
SCALE IN FEET

FIGURE 1

Halliburton NUS CORPORATION

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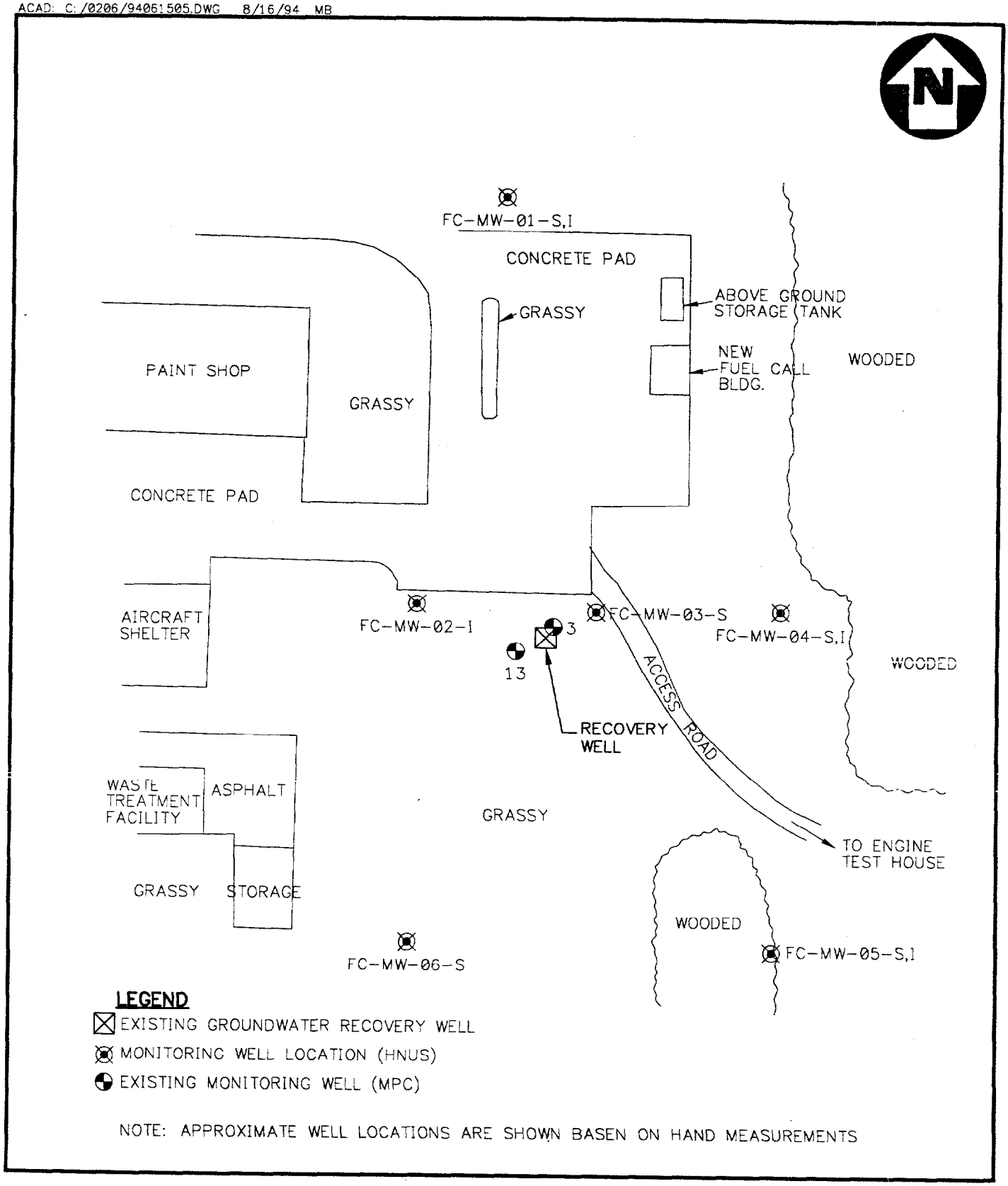

SITE 6A - LOCATION OF TEMPORARY MONITORING WELL POINTS - FUEL CALIBRATION AREA
MWIRP, CALVERTON, NEW YORK

FIGURE 2

0 150 300
SCALE IN FEET

Halliburton NUS CORPORATION

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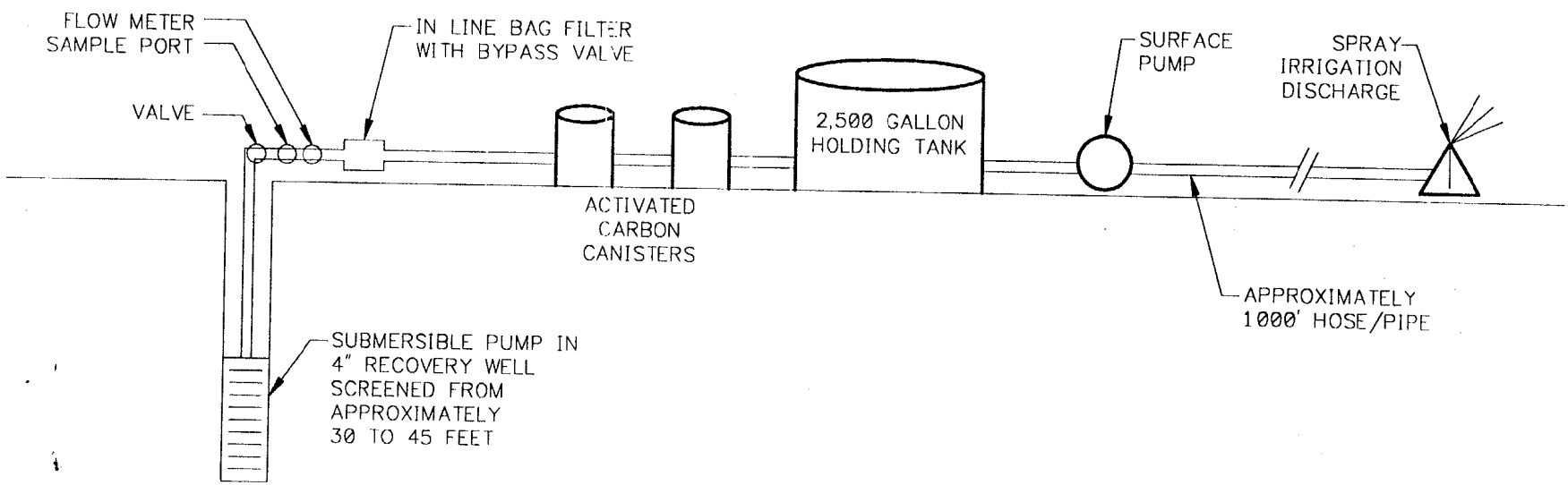

FIGURE 3

FIRE TRAINING AND FUEL CALIBRATION SITES
PUMPING TEST SETUP
NWIRP, CALVERTON, NEW YORK

Halliburton NUS CORPORATION