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REMEDIAL DESIGN REPORT
MODIFIED IRM GROUNDWATER TREATMENT SYSTEM
FORMER UNISYS FACILITY
GREAT NECK, NEW YORK
NYSDEC SITE ID# 130045

3-30-00

Prepared for

Lockheed Martin Corporation

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Remedial Design Report
Modified IRM Groundwater
Treatment System
Former Unisys Facility
Great Neck, New York
NYSDEC Site ID # 130045

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Disclosure Statement

The laws of New York State require that the corporations, which render engineering services in New York be owned by individuals licensed to practice engineering in the State. ARCADIS Geraghty & Miller, Inc. cannot meet that requirement. Therefore, all engineering services rendered to Lockheed Martin Corporation in New York are being performed by GM Consulting Engineers, P.C., a New York Professional corporation qualified to render professional engineering in New York. There is no surcharge or extra expense associated with the rendering of professional services by GM Consulting Engineers, P.C.

ARCADIS Geraghty & Miller, Inc. is performing all those services, which do not constitute professional engineering and is providing administrative and personnel support to GM Consulting Engineers, P.C. All matters relating to the administration of the contract with Lockheed Martin Corporation are being performed by ARCADIS Geraghty & Miller, Inc. pursuant to its Amended and Restated Services Agreement with GM Consulting Engineers, P.C. All communications should be referred to the designated project manager at ARCADIS Geraghty & Miller.

Statement of Certification

On behalf of Lockheed Martin Corporation, this is to certify that the enclosed Remedial Design, which includes Technical Specifications and Design Drawings, for the Modified Interim Remedial Measures Groundwater Treatment System was prepared in accordance with the NYSDEC Consent Order (Index # W1-0787-96-12) referencing the Former Unisys Corporation Site (Code #1-30-045) and dated October 29, 1997.

SIGNED: _____

Glenn Netuschil, P.E.
License Number 074741, New York
Vice President
GM Consulting Engineers, P.C.

1. Introduction

ARCADIS Geraghty & Miller, Inc. and its engineering subcontractor, GM Consulting Engineers, P.C. have been retained by Lockheed Martin Corporation (LMC) to perform remedial design (RD) services at the former Unisys facility in Great Neck, New York (Facility). The Facility occupies approximately 94 acres in Nassau County, New York and is situated in both the Village of Lake Success and the Town of North Hempstead. The RD activities are being conducted pursuant to Administrative Order on Consent (AOC) No. W1-0787-96-12, entered into by LMC with the New York State Department of Environmental Conservation (NYSDEC) in 1997.

This design report summarizes the background, objectives, design parameters, and preliminary conceptual operations of a proposed modified IRM groundwater treatment system for Operable Unit 1 (OU-1). The proposed OU-1 on-site modified IRM groundwater treatment system consists of three (one existing) groundwater recovery wells and an above-grade treatment building housing system controls and appurtenances. Two packed column air stripping units and a vapor phase treatment system will be located adjacent to the building.

Accompanying this design report are design drawings and technical specifications that represent the illustrative and technical portion of the engineering documents.

2. Project Background

In 1991, Unisys Corporation (a previous Facility owner) entered into AOC No. W-1-0527-91-02 with the NYSDEC. The AOC required completion of a Remedial Investigation/Feasibility Study (RI/FS) and implementation of Interim Remedial Measures (IRM) for soil and groundwater. The existing groundwater IRM was initiated in April 1993 and is comprised of a series of recovery and diffusion wells, liquid-phase granulated activated carbon adsorbers, and low-profile air strippers. The NYSDEC divided the site into two operable units in 1995. OU-1 includes the 94-acre subject facility, while OU-2 consists of the off-site areas. LMC and the NYSDEC entered into an AOC (No. W1-0787-96-12) in 1997 for OU-1. The Record of Decision (ROD) detailing the remedies selected for OU-1 was signed by the NYSDEC on March 31, 1997.

LMC completed and submitted a detailed design for the OU-1 treatment system in June 1998. Subsequent to this submittal, additional ground water modeling was conducted in response to comments raised by the NYSDEC. This modeling demonstrated that the

proposed system, while successfully capturing a portion of the downgradient VOC plume, would spread the plume in the upgradient direction. Based on this analysis, additional options were analyzed in an effort to develop a more comprehensive approach to the remediation of groundwater on and off-site. Based on these evaluations it was determined that an alternative on-site pumping and off-site discharge arrangement, integrated with an appropriate extraction and treatment system for the OU-2 groundwater impacts would provide the maximum remedial benefit in the shortest time.

The first step in implementing these changes was the installation of nine, new, off-site, downgradient monitoring wells, which was completed on October 22, 1999 and the submission of the draft OU-2 Remedial Investigation Report. The second step is the design of an upgraded on-site treatment system, which is equivalent to the ROD-required remedy in terms of its ability to prevent the off-site migration of impacted groundwater and its compliance with the OU-1 remedial objectives. This report represents the design basis for the proposed OU-1 on-site modified IRM groundwater treatment system.

3. Project Objectives

The primary ROD-compliant objectives for the proposed OU-1 on-site modified IRM groundwater treatment system (modified IRM system) are as follows:

(1) To capture impacted groundwater and prevent further off-site migration in the Upper Glacial and upper and intermediate zones of the Magothy Aquifers down to a depth of 270 feet below grade.

(2) To reduce organic compound concentrations in groundwater.

(3) To interdict the downward migration of VOCs into the basal Magothy Aquifer.

To accomplish these objectives, groundwater will be pumped from three recovery wells (proposed Wells RW-1RS, RW-1RD and existing Well EW-1). The recovered groundwater will be treated and discharged to one (or more) of the following points:

- existing diffusion wells at the Facility;
- proposed diffusion wells located along the northern portion of the Facility;

- diffusion wells located on property owned by the New York State Office of Parks, Recreation and Historic Preservation (NYSPRHP) adjacent to the westbound lanes of the Northern State Parkway;

- to the Nassau County operated storm sewer and recharge basin system; or

- proposed diffusion wells located along the southern boundary of the Facility.

Each of the above options is being evaluated. While all the above discharge options result in a system that is ROD-compliant, the two off-site discharge options are preferred because they result in the most effective system as a result of the elimination in interference between the pumping and recharge wells. In fact, the off-site discharge options result in a capture zone that would exceed ROD requirements because they would extend the capture zone to the basal Magothy and prevent the further off-site migration, which is not stipulated in the ROD. For the purposes of this submittal, the option of discharging to off-site diffusion wells located on NYSPRHP property along the Northern State Parkway has been selected for specification.

4. Design Criteria

The basis for the modified IRM system design is a series of groundwater modeling scenarios that were performed with the groundwater model developed for the site by CDM (Camp Dresser & McKee). The CDM model output figure (Figure X.X) in the figures section entitled "Simulated Capture Zone of Proposed OU-1 System at 730 gpm with Recharge to Existing Diffusion Wells", which are included as attachments to this report, show the anticipated system with discharge to existing on-site diffusion wells. These figures show that the resulting capture zone is estimated to extend through the intermediate Magothy Aquifer and results in some capture in the basal Magothy Aquifer. The capture zone in the basal Magothy does not extend over the entire site; however, this is not required by the ROD, which requires evaluation of the basal Magothy only after the system is operational.

The CDM model output (Figures DEC-1A through 4) in the figures section entitled "Simulated Capture Zones of Proposed OU-1 Pumping System with a Flow Rate of 730 gpm and Off-Site Discharge of Treated Water to Diffusion Wells at the NYSPRHP Site" shows effect of pumping at 730 gpm assuming that the treated water can be discharged off-site in diffusion wells at the NYSPRHP Site. From this figure, it can be seen that the pumping creates a capture zone that not only covers the intermediate Magothy zone but extends to the basal Magothy where the groundwater

under the entire site is captured and off site migration is prevented. Because the capture zone extends to the basal Magothy, the modified IRM system with off-site discharge will exceed the ROD requirements.

Under normal operating conditions, a total of 730 gallons per minute (gpm) will be pumped by the modified IRM system. Existing Recovery Well EW-1 will pump at 365 gpm, New Recovery Well RW-1RS will pump at 265 gpm, and new Recovery Well RW-1RD will pump at 100 gpm. The dissolved volatile organic compound (VOC) concentrations used in the design of the modified IRM system are presented in Table 1. The design VOC concentrations were based on both recent analytical data from the ongoing groundwater recovery and treatment system monitoring program implemented as part of the existing IRM. Additional design goals/parameters include the following:

- Treatment system will be designed to handle a maximum of 900 gpm in case future groundwater monitoring indicates that a slightly higher rate (above 730 gpm) is necessary to achieve ROD requirements.

- Treatment will meet or exceed the effluent quality standards set by the NYSDEC in the ROD.

- Operation of the groundwater recovery and treatment system will allow for ease of visual monitoring, testing, and maintenance, with automatic control of the principal equipment units and interlocks to insure that only treated water will be discharged from the system.

- Piping connections and valving will provide flexibility in operation of the recovery and treatment system.

- Air discharges will be in conformance with NYSDEC requirements, as specified in NYSDEC Air Guide-1 and its accompanying appendices (NYSDEC 1995).

5. Description of OU-1 (on-site) Modified IRM Groundwater Treatment System

The section includes descriptions of the recovery wells and piping; the treatment process; the treatment building; the treated water discharge; and the process controls and operation.

5.1 Recovery Wells and Piping

The modified IRM system will utilize recovery well EW-1, currently in use in the existing OU-1 groundwater treatment system. RW-1 will be replaced by new recovery wells RW-1RS and RW-1RD. The locations of the recovery wells (RW-1RS, RW-1RD and EW-1) are shown on Drawing No. C-1 of the design drawing submittal. The proposed wells will be installed to total depths of approximately 210 (RW-1RS) and 270 (RW-1RD) feet below land surface (bls). The existing EW-1 well is installed to total depth of approximately 235 feet bls. The proposed recovery well RW-1RS will be screened from 144 to 164 and 173-203 feet bls and proposed recovery well RW-1RD will be screened from 240 to 270 feet bls. Existing Well EW-1 is screened from 199 to 229 feet bls.

Groundwater will be recovered from each well using submersible groundwater pumps. Each wellhead will be enclosed in a below-grade vault along with associated piping, valves and instrumentation that will include an air release valve, Cla-Val™/check valve combination, pressure indicator, isolation valve, sample tap, strainer (single basket) and a turbine flow meter. The remaining flow controls, electrical devices, and accessories associated with the recovery wells will be housed in both the well vaults and the treatment building. The influent lines from the recovery wells will be joined to the existing 10-inch diameter pipe, which will be extended below-grade to the treatment building.

Inside the treatment building, the common header from the recovery wells will include a Cla-Val™/check valve combination, pressure indicator, and sample tap. The combined flow from the common header will discharge into the first of two packed column tower air strippers.

The existing pump in recovery well RW-1 (stainless steel submersible, 50 horsepower) will be employed in recovery well RW-1RS and the existing pump in Recovery Well EW-1 (stainless steel submersible, 40 horsepower) will remain in EW-1. A new 25 horsepower stainless steel submersible pump will be installed in RW-1RD. These pumps are designed to operate at their maximum efficiency at the design flow and total dynamic head (TDH) calculated for this application. These calculations are presented in Appendix A. The Process Piping and Instrumentation Diagram (Drawing No. P-1 of the design drawing submittal) presents the piping sizes, valves, flow controls, and process flow arrangement for the treatment system. Piping layouts and details for the recovery well vaults and treatment structure are depicted on Drawings P-2, P-3, and P-4 of the design drawing submittal.

5.2 Treatment Process

Groundwater from the recovery wells will be conveyed via existing underground piping to a proposed one-story treatment building that will be located in the northeastern corner of the property. The groundwater will be pumped directly into the first packed column tower air stripper of a two tower air stripper system. Once the groundwater has passed through the first air stripper into its associated clearwell, the partially treated water will be pumped from the clearwell beneath the first air stripper into the second air stripper for further treatment. Treated water will then be pumped from a second clearwell beneath the second air stripper to the discharge piping network. Ambient air utilized to strip the VOC's will be pulled through a 2.25 foot by 6 foot intake located on clearwell No. 2, up open bottom air stripper No. 2, and through a 24-inch diameter duct to the intake of the blower. From the outlet of the blower, the air will be pushed into clearwell No. 1, up open bottom air stripper No. 1, and through a 24-inch diameter duct into the intake of the vapor phase granular activated carbon (VPGAC) unit for off-gas treatment. The treated off-gas will be discharged to the atmosphere via a single 24-inch diameter stack mounted to the side of air stripper No. 1.

The two tower air strippers in series will be used to reduce VOC concentrations in the recovered groundwater to NYSDEC effluent standards. Air stripping is an effective means of removing VOCs from water and has the advantage of relatively low operation and maintenance (O&M) requirements. Typical packed column air stripping units consist of vertical towers partially filled with an inert, high surface area packing material. The function of the packing material is to increase the surface area over which the water must flow, thus enhancing the opportunity for air/water mixing. The VOCs dissolved in the water being treated are driven out of the water stream by the concentration gradient between the water and the air. The VOCs enter the air stream and are then removed in the VPGAC system.

The air stripping treatment system will be designed based on the expected maximum influent concentrations of VOCs and the allowable VOC effluent concentrations listed in Table 2. Because cis-1,2-dichloroethene (cis-1,2-DCE) is expected to be present at higher concentrations than the other VOCs in the influent groundwater and because it has a relatively low Henry's Law constant, it controls the packed column air strippers design. By meeting the required effluent concentrations for cis-1,2-DCE, the other VOCs present will also be removed to acceptable levels. An additional factor of safety is provided to the air strippers' design since the system will be capable of treating a maximum hydraulic load of 900 gpm. The minimum removal efficiencies for the

tower air strippers are summarized in Table 2 along with the design air-to-water ratio, air flow rate, water flow rate, and water temperature.

Modeling indicates that a total of 51 vertical feet of packing material in two, nominal 6.5 foot diameter towers will be required to remove cis-1,2-DCE to less than a target effluent standard of 2 micrograms per liter (µg/L). The results of the modeling calculations are presented in Appendix B. The tower air strippers will be located outside of a one-story treatment building and will be self-supporting (see Drawing P-2 of the design drawing submittal). The total height of each tower will be 29.5 feet to conform with local building codes.

5.3 Treatment Building

The treatment building will be designed and constructed in conformance with New York State building code requirements. The proposed building will be comprised of:

(1) a treatment building with three rooms that will house the influent and effluent piping, draft induction blower, and electrical controls;

(2) two below-grade clearwells beneath the southern end and adjacent to the western side of the treatment building; and

(3) a concrete pad to support the VPGAC unit for off-gas treatment.

The three rooms of the treatment building will house the lavatory, the electrical controls (Control Room), and the process equipment (Equipment Room). The Equipment Room will house the draft induction blower and the flow meter, flow control valves, and pressure indicators associated with the influent and effluent piping. The treatment building equipment layout and piping are presented on Drawings P-2 and P-3 of the design drawing submittal.

The interior of the Control Room will be approximately 20 feet long by 14 feet wide and 10 feet in height, providing approximately 280 square feet of floor space. The interior of the Equipment Room will be approximately 36 feet long by 11 feet wide and nine feet in height, providing approximately 396 square feet of floor space. Personnel access to the facility will consist of three metal personnel doors (two in the equipment room and one in the control room). Personnel access from the Control Room to the Equipment Room will be provided through a metal personnel door. Access to service the blower (i.e., remove the blower, if necessary) will be provided through an overhead

door on the northern side of the treatment building. Two reinforced concrete clearwells (23 feet by 11 feet by 8 feet deep and 23 feet by 9 feet by 8 feet deep) will be constructed below grade beneath the southern end and adjacent to the western side of the treatment building. The clearwells will allow for installation of open-bottom tower air strippers. The tower air strippers will be located directly above the two clearwells and will extend approximately 2.25 feet into each clearwell. Access to the stripper internals will be provided by a caged ladder with intermediate landings between the two towers. The tower air strippers will be bolted to the top of the clearwells. The tower air strippers will be constructed with open bottoms to allow the strippers to drain by gravity into their associated clearwell. Access to the clearwells and associated pumps will be provided via two gas-tight hatches within the treatment building.

A VPGAC unit will be positioned on a concrete pad directly west and adjacent to the tower air strippers. This unit will measure approximately 24.25-ft. long by 8.5-ft. wide by 10-ft. high. It will contain approximately 20,000 lbs of carbon.

5.4 Treated Water Discharge

The modified IRM system is designed for each recovery well to pump continuously at an optimal flow rate of 365 gpm for EW-1, 265 gpm for RW-1RS and 100 gpm for RW-1RD under normal operating conditions (the maximum flowrate from EW-1 and RW-1RS will be 450 gpm and 250 gpm from RW-1RD). Recovery wells will only shut down in the event of a treatment system failure, in an emergency, or as required for normal maintenance and carbon changeout events.

During normal operation, the recovery wells will pump groundwater directly to the top of air stripper No. 1 for treatment, with the effluent flowing by gravity to clearwell No. 1. A 20-horsepower vertical turbine pump will be provided to deliver water from clearwell No. 1 to the inlet of air stripper No. 2. The effluent will flow by gravity to clearwell No. 2 where a 15-horsepower vertical turbine pump will pump the treated water from clearwell No. 2 through the discharge piping network. The discharge flow from each of the clear wells will be controlled by a motorized flow-control valve. The valve will open and close in order to maintain a pre-determined operating water level as monitored by a pressure transducer. The discharge piping is designed to accommodate a design flow of 1,000 gpm.

The treated discharge will be pumped to one of the following:

- existing diffusion wells at the Facility;
- proposed diffusion wells located along the northern portion of the Facility;
- diffusion wells located on property owned by the New York State Office of Parks, Recreation and Historic Preservation (NYSPRHP) adjacent to the westbound lanes of the Northern State Parkway; or
- to the Nassau County operated storm sewer and recharge basin system.
- proposed diffusion wells located along the southern boundary of the Facility.

The clearwell pump will also be utilized to supply recirculation water to the air stripper if cleaning or flushing is necessary. The TDH has been calculated for the clearwell pump assuming discharge to the off-site diffusion wells. These calculations are presented in Appendix C.

The clearwells will be 23 feet long by 11 feet and 9 feet wide by 8 feet in depth, with a total capacity of approximately 12,000 gallons each. The opening at the base of each tower air stripper will be 6.5 feet in diameter. The operating water level in each clearwell will be approximately 4 feet. This operating level will be maintained by level switches and a pressure transducer to allow for proper operation of the vertical turbine pumps. It will also provide adequate remaining capacity to hold groundwater draining out of the stripper in the event of an emergency shutdown. When the groundwater treatment system is operating at its design flow rate (730 gpm) and the vertical turbine pumps are pumping water at an equal flow rate, the water in the clearwells have an approximately 6-minute residence time. Sizing calculations for the clearwells are presented in Appendix D.

5.5 Air Emissions

The air emission limitations for the air stripper off-gas were derived from NYCRR Part 200 and New York's Air Guide-1. Limitations for the constituents in the air stream were selected using the Air Guide-1 specified Annual Guideline Concentrations (AGCs) and Short-Term Guideline Concentrations (SGCs). The AGCs provide a more conservative (lower) maximum hourly emissions rate and were used as the design

limitations. A summary of the air emissions limitations and toxicity information for each constituent in the air stripper off-gas is presented in Table 3.

The design loading rates for the air stripper off-gas were then calculated for each constituent in the air stream. The results of the modeling are presented in Appendix E. The loading rate calculations were completed based upon the following assumptions:

- At maximum operating conditions, the groundwater flow rate into the air stripping system will be 900 gpm.
- At maximum operating conditions, the air/water ratio for the air stripper will be 60:1.
- The tower air stripper would facilitate complete mass transfer from the dissolved phase to the vapor phase.

A direct comparison of the resulting ERPs with the maximum allowable emissions rates indicates that all of the constituents in the air stream will be equal to or less than their respective AGCs following vapor phase treatment.

5.6 Utility Service

Electric service will be obtained from existing Long Island Power Authority (LIPA) overhead 13.2 kV power lines located on the north side of Marcus Avenue. The power will be transferred via underground duct bank from the power pole to a utility transformer installed on the north side of the proposed treatment facility. The on-site utility transformer is expected to provide approximately 1200 kVA of electrical power. From the transformer, power will be distributed at 460 volts to the appropriate equipment locations. Controls and instrumentation for the operation of the treatment system and associated recovery wells will be located in the main treatment building, and distributed from that point. The networking will enable the control and monitoring of the entire system via a single serial node, which can be monitored and controlled via personal computer or remote dialup modem.

Potable water supply will be obtained from Lakeville Manhasset Water District. A tap will be installed in the existing water line located in Marcus Avenue to provide water service to the treatment building.

Sanitary sewer service will be obtained from Nassau County Department of Public Works. A tap will be installed in the existing line which runs underneath Marcus Avenue.

5.7 Process Controls and Operation

The process control system will be designed to provide the necessary safeties and interlocks to ensure that the recovery wells, piping, and treatment system operate smoothly, efficiently, and as a unit. Additionally, the system will include the capability of allowing local or remote operator(s) to observe and control the operation of the system from a single computer workstation.

Controls and instrumentation will be interconnected via serial network, utilizing network wiring installed in exposed conduit. The actual network and control connection layout is presented on Drawings E-2 through E-5 of the design drawing submittal. The main control panel (MCP), located in the control room of the treatment building, will house a Programmable Logic Controller (PLC) to monitor and integrate the operation of the recovery well and clearwell pumps, air stripping system and all treatment system interlocks. This panel will serve as the node through which remote control and communication with the control system will take place.

The following sections describe the operation, system monitoring, alarm conditions, system interlocks, and anticipated start-up sequence.

5.7.1 Operation and Programmable Logic Controller

Under normal operating conditions, the control system will monitor groundwater recovery flow rates from each recovery well. Extracted water from the recovery wells will be transferred via a common underground header pipe to the treatment building, where the flow will be treated via the tower air stripping system. Semi-treated groundwater will flow by gravity from the first air stripper to its associated clearwell at which it will be pumped to the inlet of the second air stripper by a vertical turbine pump. The treated groundwater will then drain to the second clearwell, after which, the treated water will be discharged via a vertical turbine pump. The control system will monitor and automatically maintain the operating water levels within both clearwells. This will ensure that the pumping rates are synchronized.

A hand/off/auto switch will be provided on the MCP to operate the blower. The blower discharge will include a high pressure switch, and low pressure switch. These

instruments will be tied to alarms mounted on the MCP. Recovery pumps will be operated with hand/off/auto switches. The recovery pump switches will not operate unless the blower switch is in the "on" position and the blower is running. Motorized valves will be installed on the discharge of the vertical turbine pumps associated with the clearwells. These valves will accommodate an analog signal from the MCP which will modulate the flow from the associated clear well pump in order to maintain a constant pre-set water level in the associated clearwell. The vertical turbine pumps will not operate unless the blower is running. This will ensure that groundwater is not pumped through the air stripping system without receiving treatment.

Pressure transducers will be installed within the clearwells to transmit the clearwell water levels and control their associated motorized valves. The vertical turbine pump motorized valves are flow control valves that will be actuated based on the water level in their associated clearwell. The pressure transducers will relay a signal to the MCP in order to operate the motorized valves. Additionally, level switch floats will be installed in the clearwells to control the operation of the vertical turbine pumps. The vertical turbine pumps will not engage unless the blower is running, the motorized discharge valve is open, the water level is above the LSN set point and the pump switch is in the "hand" or "auto" position.

The PLC will be utilized to provide the necessary control logic to coordinate the control signals from the remote switches and instrumentation throughout the treatment system. These interlocks will provide fail-safes and monitor operating conditions of the treatment system.

5.7.2 Monitoring

Flow meters will be provided for each recovery well, and on the system discharge piping, to monitor flow rates, as well as to allow adjustment of flow control valve settings by both manual and automated means. This equipment will be used to monitor the pumping rate at each recovery well. The extracted flow from the individual recovery wells will be totalized at the MCP.

Additional hydraulic and analytical monitoring of the OU-1 groundwater remedy will be performed to ensure capture of the impacted groundwater. The details of a groundwater monitoring program and operation and maintenance program will be discussed in plans to be submitted to the NYSDEC in the near future.

5.7.3 Alarms and Interlocks

The recovery wells, air stripper, and clearwell pumps will be interlocked and alarmed to ensure that the water is properly treated. The air stripper blower will be operated via a hand/off/auto switch mounted on the MCP. Operation of the various system components including the recovery well pumps and the motorized clearwell pump discharge valves will be dependent upon the operation of the blower. Interlocks will be established such that untreated water will not be discharged from the air stripper system in the event that the blower is not operating.

Hand/off/auto switches will be provided in the treatment building and well vaults for each recovery pump. Recovery well pumps will be operated in the "auto" position during normal system operation. Interlocks have been established such that the recovery wells will not operate unless the air stripper blower is operating (i.e., blower switch is in the "on" or "auto" position and no faults are identified). In order to override this safety feature, the pumps may be operated in the "hand" position. Each pumping well location will be equipped with an emergency stop override switch for interruption of well pump operation.

Treated water will flow by gravity from the air strippers into their associated clearwells. Level switches will be installed within the clearwells in order to control operation of the clearwell pumps. The level switches will include the following:

- Level Switch High High (LSHH)
- Level Switch High (LSH)
- Level Switch Normal (LSN)
- Level Switch Low (LSL)
- Level Switch Low Low (LSLL)

These level switches will primarily control operation of the vertical turbine pumps; however, the entire treatment system will be linked to these switches via a network of interlocks. As water levels rise within the clearwells, the vertical turbine pumps will be latched once the LSL is engaged and started once the LSN is engaged. At this point, treated water will be pumped from the clearwells. The motorized control valve on the discharge from the vertical turbine pumps will be used to modulate discharge flow and allow the pump to operate continuously. Interlocks will be established between

pressure transducers installed within the clearwells and motorized discharge valves. Based on the head in the clearwells, the motorized discharge valves will be throttled open or closed such that a preset head, equivalent to a water level set-point between the LSN and LSL, is maintained within the clearwells. If the level in the clearwells disengages the LSL (i.e., drops the switch to the open position), the vertical turbine pumps will be shut down. If the levels drop below the LSLL in either of the two clearwells, the entire treatment system will be shut down. In the event of a pressure transducer failure or if the pressure transducer is taken off-line, the motorized control valve will freeze in its given position. In the event the level in the clearwells rise above the LSH the recovery well pumps will be shut down. If the LSH alarm is not cleared within ten minutes, the entire system will be shut down. The vertical turbine pumps will continue to operate and purge the treated water from the clearwells. Once the water levels drop below the LSN, the recovery well pumps will be started again and system operation will continue. In the event the LSHH is engaged, the entire treatment system will be shut down. Upon a complete system shutdown the air strippers blower will run for an additional ½ hour (unless the blower is the cause of the shutdown). This will ensure that water purged from the clearwells is treated.

Additional interlocks will be established to control the air stripper blower. Specifically, a high and low pressure switch, will be installed on the discharge from the blower. High discharge temperature from the blower will result in an alarm on the MCP; however, system operation will continue. The alarm must be cleared within 72 hours; otherwise, a sequential shutdown will take place. High pressure and low pressure on the blower discharge will lead to a sequential shutdown to the entire system.

6. Permitting

A completed NYSDEC Air Facility Registration form is included as Appendix F. The proposed facility is exempt from registration pursuant to 6 NYCRR Part 201-3.3(c)(29).

A completed State Pollutant Discharge Elimination System (SPDES) industrial application form is included as Appendix G. Section 5.4 of this report lists the various discharge options being evaluated at the site. Outfalls 001, 002, and 003 are identified in the SPDES application form for purposes of the design submittal as the off-site discharge option to the diffusion wells located along the Northern State Parkway. In the event the discharge option changes, ARCADIS Geraghty & Miller will submit a permit modification. Note that for purposes of design, the pump in clearwell 2 was

sized for the worst case scenario (discharge to diffusion wells located along the Northern State Parkway).

7. Security

To prevent any vandalism, the following security measures are specified in the building/site design:

- Light and/or motion sensing lights around the proposed treatment building;
- A 6-foot fence around the treatment building;
- Security system in the treatment building;
- No windows on the building;
- Locks on the building and the below grade structures; and
- Access barrier on air stripper ladder/platform assembly.

8. References

New York State Department of Environmental Conservation, 1995 Air Guide-1, Appendix B.

State of New York Department of Environmental Conservation, Order On Consent, Site # 30-045, Index # AOC No. W-1-0787-96-12, 1996.

State of New York Department of Environmental Conservation, Order On Consent, Index # AOC No. W1-0527-91-02, 1996.

Tables

Table 1. Design Influent VOC Concentrations, OU-1 Groundwater Treatment System
Former Unisys Facility, Great Neck, New York.

	Historical Combined Recovery Data (Recovery Wells RW-1 and EW-1)						Recent Combined Recovery Data (Recovery Wells RW-1 and EW-1)	
Constituent	5/4/99 (ug/L)	5/14/99 (ug/L)	6/25/99 (ug/L)	7/29/99 (ug/L)	9/28/99 (ug/L)	10/12/99 (ug/L)	1/13/00 (ug/L)	1/31/00 (ug/L)
Tetrachloroethene	130	130	140	84	130	150	140	130
Trichloroethene	98	100	78	75	95	120	100	89
1,1-Dichloroethene	3	4	1	--	--	5	--	--
cis-1,2-Dichloroethene	1,800	1,800	1,200	910	1,600	1,500	1,400	1,300
Vinyl chloride	30	23	26	24	100	57	58	88
Freon 113	2	4	1	--	42	53	39	39

Notes:

-- Not reported

ug/L Micrograms per liter, equivalent to parts per billion (ppb)

(1) Because of its elevated concentration and low Henry's Law constant, cis-1,2-dichloroethene (cis-1,2-DCE) will control the system design. Subsequently a safety factor of 2.5 was applied to the average concentration for this constituent. Adequate treatment for the selected design concentration of cis-1,2-DCE will ensure adequate treatment of the remaining target constituents.

Table 2. Air Stripper Design Concentrations, OU-1 Groundwater Treatment System
Former Unisys Facility, Great Neck, New York.

Design air/groundwater ratio	60:1	
Design flow rate (groundwater)	900	gpm
Design airflow rate	7219	cfm
Influent groundwater temperature	50	°F

Constituent	Air Stripper Design Influent[1] (ug/L)	Effluent Limit [2] (ug/L)	Target Effluent Concentration (ug/L)	Minimum Removal Efficiency (%)
Tetrachloroethene	135	5	2	98.52
Trichloroethene	95	5	2	97.89
1,1-Dichloroethene	3	5	2	33.33
cis-1,2-Dichloroethene	4,500	5	2	99.96
Vinyl chloride	73	2	2	97.26
Freon 113	39	5	2	94.87

Notes:

ug/L Micrograms per liter.
gpm Gallons per minute.
cfm Cubic feet per minute.
(1) Refer to Table 1.
(2) Values previously accepted by New York State Department of Environmental Conservation (NYSDEC) Based on Surface/Groundwater Quality Standards and Groundwater Effluent Standards for class GA groundwater published in 6 NYCRR Part 703; and NYSDEC's October 1993 Division of Water and Technical Operation Guidance Series.

Table 3. Air Stripper Off-Gas Emission Limitations, OU-1 Groundwater Treatment System
Former Unisys Facility, Great Neck, New York.

Constituent	CAS Number	AGC (ug/m^3)	SGC (ug/m^3)	Toxicity
Tetrachloroethene	127-18-4	1.2	40,000	Moderate
Trichloroethene	79-01-6	0.45	33,000	Moderate
1,1-Dichloroethene	75-35-4	0.02	2,000	High
cis-1,2-Dichloroethene	540-59-0	1,900	190,000	Moderate
Vinyl chloride	75-01-4	0.02	1,300	High
Freon 113	76-13-1	30,000	1,800,000	Low

Notes:

ug/m^3	Micrograms per cubic meter of air
CAS	Chemical Abstracts Service
AGC	Annual Guidance Concentration
SGC	Short-Term Guidance Concentration

Figures

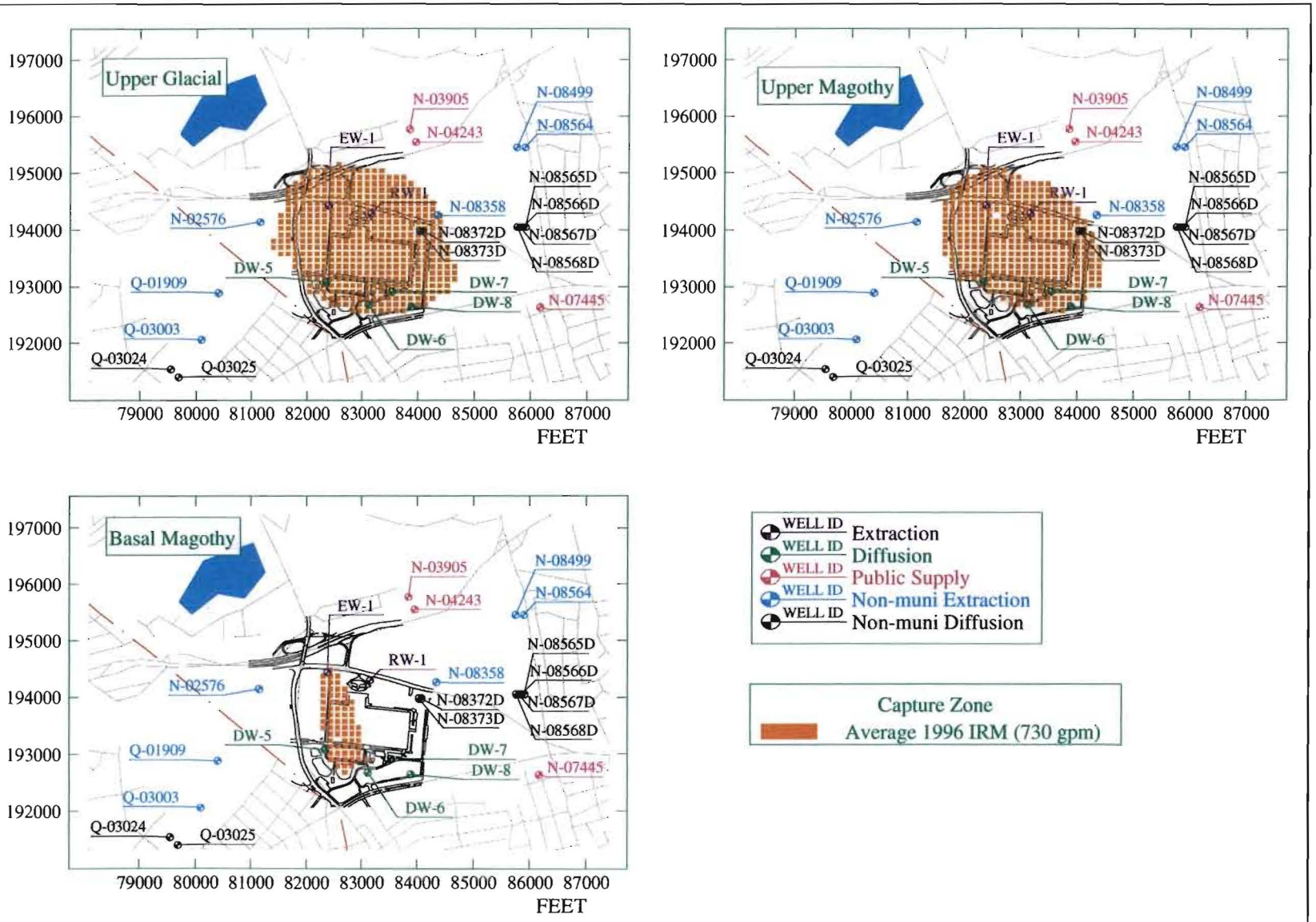


FIGURE X.X	Capture Zone Analysis Average 1996 IRM Pumping (730 gpm) OU-1 Groundwater Remediation Lockheed Martin - Great Neck, New York	CDM environmental engineers, scientists, planners, & management consultants

Figures

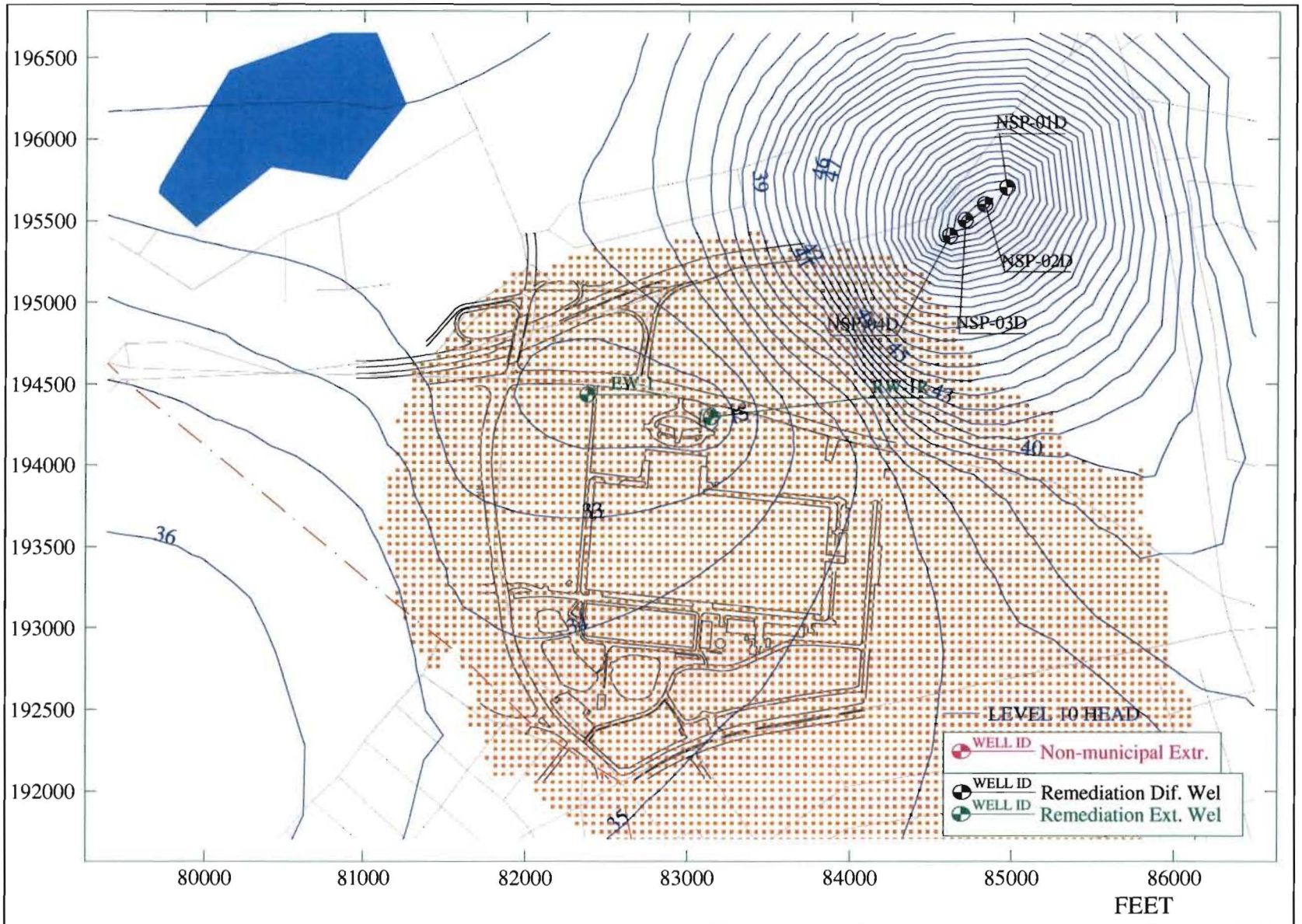


FIGURE DEC-1A-1	Simulated Upper Glacial Capture Zone Scenario 1A Lockheed Martin - Great Neck, New York December 1999	consulting engineering construction operations CDM

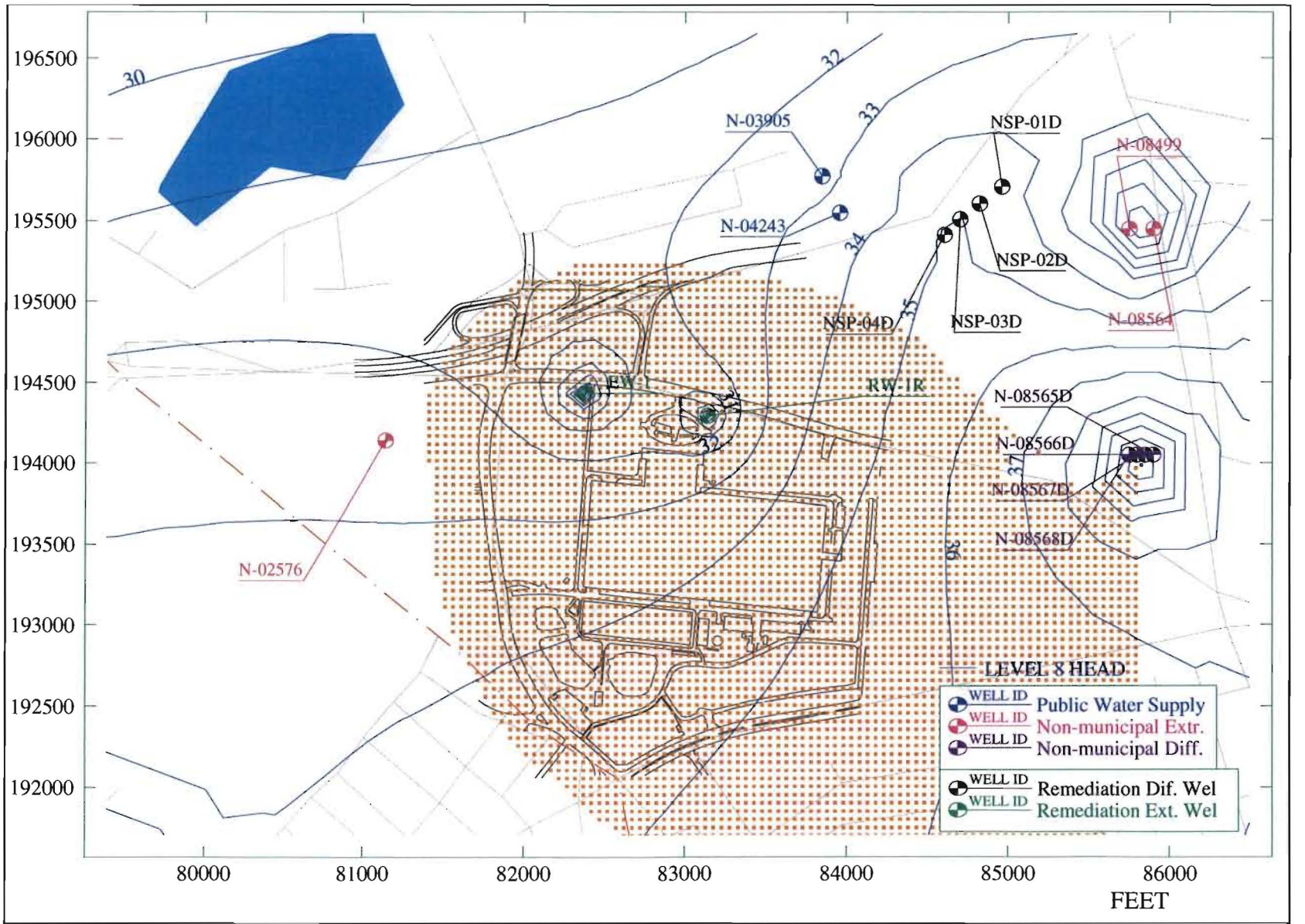


FIGURE
DEC-1A-2

Simulated Upper Magothy Capture Zone
Scenario 1A
Lockheed Martin - Great Neck, New York
December 1999

consulting engineering construction operations CDM

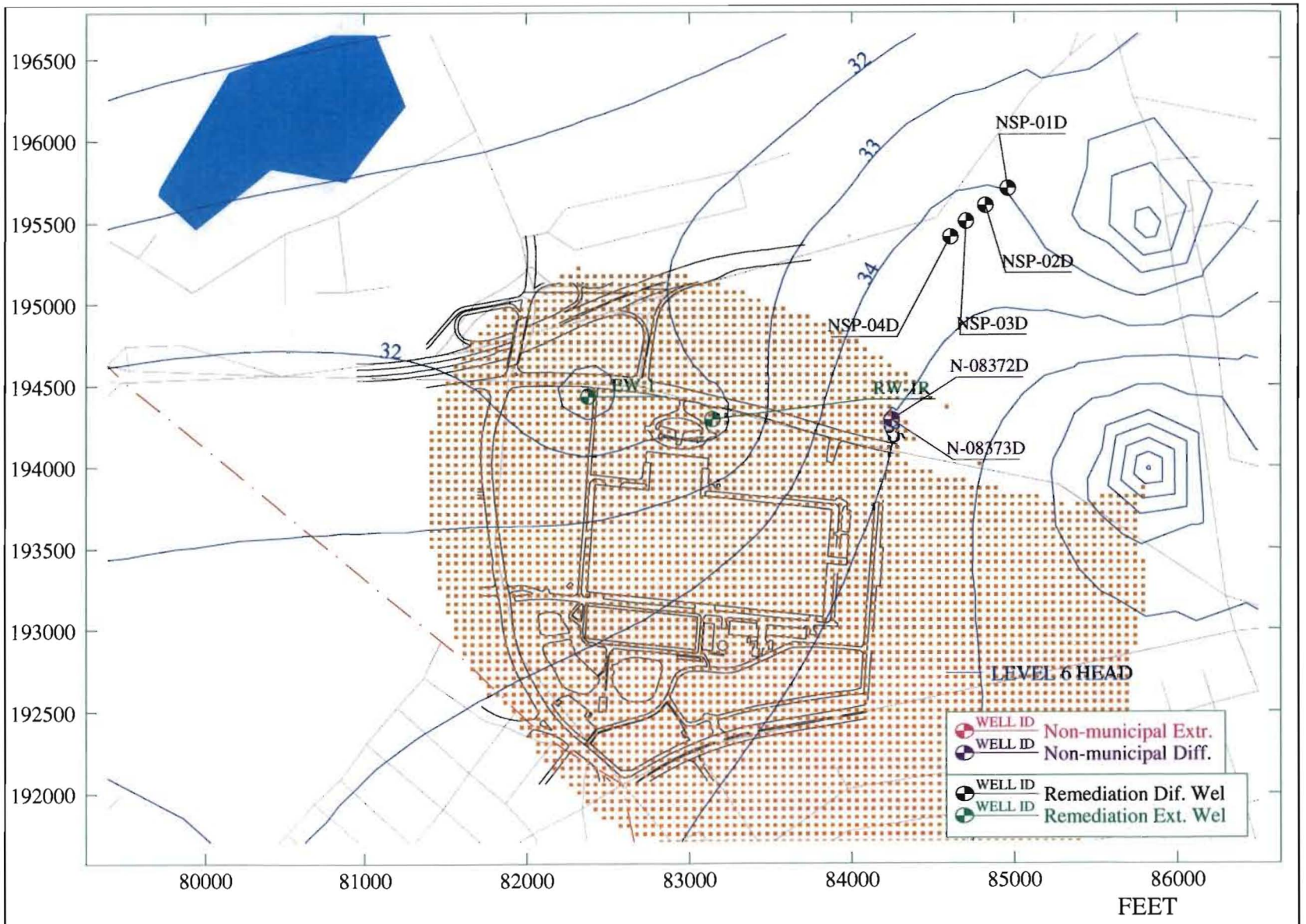


FIGURE DEC-1A-3	Simulated Middle Magothy Capture Zone Scenario 1A Lockheed Martin - Great Neck, New York December 1999	consulting engineering construction operations CDM

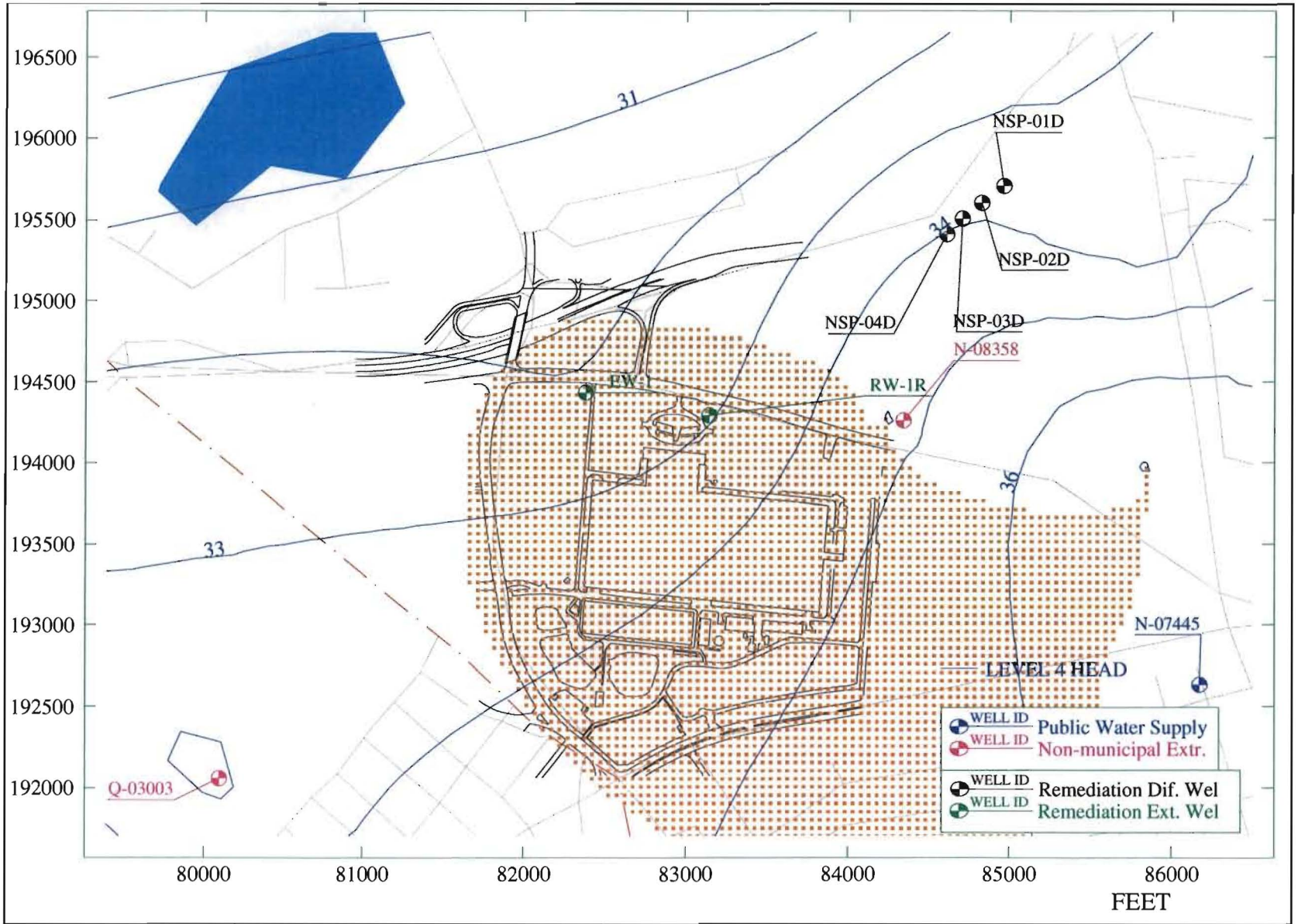


FIGURE
DEC-1A-4

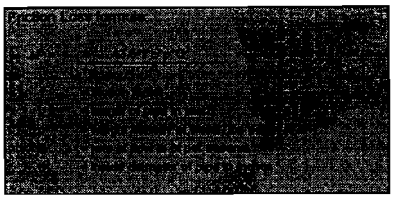
Simulated Basal Magothy Capture Zone
Scenario 1A
Lockheed Martin - Great Neck, New York
December 1999

consulting engineering construction operations CDM

Appendix A

Total Discharge Head Calculations,
Recovery Well Pumps

Preliminary Head Loss Calculations for EW-1, OU-1 Groundwater Treatment System
Former Unisys Facility, Great Neck, New York.

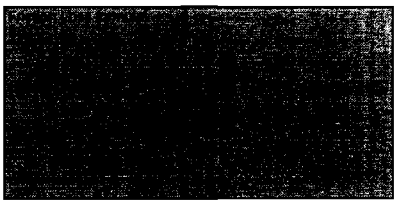


Description	ΔH (feet)	Design Flow (gpm)	Design Flow (cfs)	Inside Diameter (inches)	Pipe Length (feet)	Fitting/Valve Equivalent Length (feet)	Fitting/Valve Quantity	Friction Factor (f)	Resistance Coefficient (K)	Pressure Loss (psi)
Static head from pumping water level to Air Stripper #1	157.8	--	--	--	--	--	--	--	--	--
From pump to well vault:										
Piping (6" steel)	--	450	1.003	6	194	--	--	0.015	--	1.02
From wellhead to main header:										
Piping (6" steel)	--	450	1.003	6	38	--	--	0.015	--	0.20
Elbow (90)	--	450	1.003	6	--	15	1	0.015	0.45	0.08
Clay-val[1]	--	450	1.003	6	--	--	1	0.015	--	1.00
Butterfly valve [2]	--	450	1.003	6	--	--	1	0.015	--	0.13
Elbow (90)	--	450	1.003	6	--	15	1	0.015	0.45	0.08
Basket strainer[3]	--	450	1.003	6	--	--	1	0.015	--	0.50
Flowmeter[4]	--	450	1.003	6	--	--	1	0.015	--	0.50
Elbow (90)	--	450	1.003	6	--	15	1	0.015	0.45	0.08
Tee (branch)	--	450	1.003	6	--	30	1	0.015	0.9	0.16
Expansion	--	450	1.003	6	--	105	1	0.015	3.16	0.55
Piping (10" cast iron)	--	450	1.003	10	810	--	--	0.014	--	0.31
Elbow (45)	--	450	1.003	10	--	13	1	0.014	0.224	0.01
Elbow (45)	--	450	1.003	10	--	13	1	0.014	0.224	0.01
Gate valve (beta = 1, theta = 0)	--	450	1.003	10	--	7	1	0.014	0.112	0.00
Tee (flow through)	--	450	1.003	10	--	17	1	0.014	0.28	0.01
Gate valve (beta = 1, theta = 0)	--	450	1.003	10	--	7	1	0.014	0.112	0.00
Piping (10" cast iron)	--	900	2.005	10	1035	--	--	0.014	--	1.58
Main header:										
Gate valve (beta = 1, theta = 0)	--	900	2.005	10	--	7	1	0.014	0.112	0.01
Tee (flow through)	--	900	2.005	10	--	17	1	0.014	0.28	0.03
Tee (flow through)	--	900	2.005	10	--	17	1	0.014	0.28	0.03
Elbow (90)	--	900	2.005	10	--	25	1	0.014	0.42	0.04
Elbow (90)	--	900	2.005	10	--	25	1	0.014	0.42	0.04
Elbow (90)	--	900	2.005	10	--	25	1	0.014	0.42	0.04
Tee (flow through)	--	900	2.005	10	--	17	1	0.014	0.28	0.03
Contraction	--	900	2.005	10	--	24	1	0.014	0.41	0.04
From main header to Stripper1:										
Piping (8" steel)	--	900	2.005	8	80	--	--	0.014	--	0.37
Elbow (90)	--	900	2.005	8	--	20	1	0.014	0.42	0.09
Elbow (90)	--	900	2.005	8	--	20	1	0.014	0.42	0.09
Check Valve[5]	--	900	2.005	8	--	--	1	0.014	--	0.50
Elbow (90)	--	900	2.005	8	--	20	1	0.014	0.42	0.09
Elbow (90)	--	900	2.005	8	--	20	1	0.014	0.42	0.09
Tee (flow through)	--	900	2.005	8	--	13	1	0.014	0.28	0.06
Elbow (90)	--	900	2.005	8	--	20	1	0.014	0.42	0.09
Elbow (90)	--	900	2.005	8	--	20	1	0.014	0.42	0.09
Elbow (90)	--	900	2.005	8	--	20	1	0.014	0.42	0.09
Sharp edged pipe exit	--	900	2.005	8	--	48	1	0.014	1	0.22
[redacted]										

Notes:
Unless noted otherwise, friction factors and resistance coefficient formulas for steel pipe and fittings taken from *Flow of Fluids Through Valves, Fittings, and Pipe*, Crane Co., 1978
Friction loss formula taken from *Flow of Fluids Through Valves, Fittings, and Pipe*, Crane Co., 1978
Headloss through valves assumes valves are in fully open position.
Static head determined as follows: depth to pumping water level = -10.5 feet mean sea level (msl) and inlet to air stripper #1 is 147.3 feet msl. [147.3- -10.5 = 157.8]
These calculations based upon the maximum anticipated pumping rate from each individual well. The maximum total flow rate to the treatment system is 900 gpm.

(1) Headloss provided by Cla-Val for model 60-31
(2) Headloss provided by Henry Pratt Company nomograph for butterfly valves
(3) Headloss provided by Stainless Specialties, Inc.
(4) Headloss provided by Badger Meters for model Recordall Turbo 2000 Meter
(5) Headloss provided by Cla-Val for model 501

Preliminary Head Loss Calculations for RW-1RS, OU-1 Groundwater Treatment System
Former Unisys Facility, Great Neck, New York.

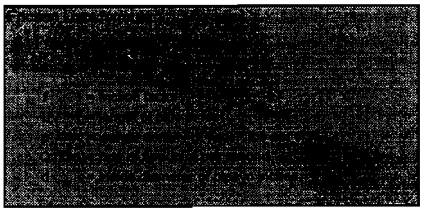


Description	ΔH (feet)	Design Flow (gpm)	Design Flow (cfs)	Inside Diameter (inches)	Pipe Length (feet)	Fitting/Valve Equivalent Length (feet)	Fitting/Valve Quantity	Friction Factor (f)	Resistance Coefficient (K)	Pressure Loss (psi)
Static head	157.8	–	–	–	–	–	–	–	–	–
From pump to well vault:										
Piping (6" steel)	–	450	1.003	6	135	–	–	0.015	–	0.71
Well vault:										
Piping (6" steel)	–	450	1.003	6	10	–	–	0.015	–	0.05
Elbow (90)	–	450	1.003	6	–	15	1	0.015	0.45	0.08
Clay-val[1]	–	450	1.003	6	–	–	1	0.015	–	1.00
Elbow (90)	–	450	1.003	6	–	15	1	0.015	0.45	0.08
Basket strainer[3]	–	450	1.003	6	–	–	1	0.015	–	0.50
Butterfly valve [2]	–	450	1.003	6	–	–	1	0.015	–	0.13
Flowmeter[4]	–	450	1.003	6	–	–	1	0.015	–	0.50
Expansion	–	450	1.003	6	–	20	1	0.015	0.60	0.11
From well vault to main header:										
Piping (6" steel)	–	450	1.003	8	130	–	–	0.015	–	0.16
Elbow (90)	–	450	1.003	8	–	20	1	0.015	0.45	0.02
Tee (flow through)	–	450	1.003	8	–	13	1	0.014	0.28	0.02
Elbow (45)	–	700	1.560	8	–	11	1	0.014	0.224	0.03
Elbow (45)	–	700	1.560	8	–	11	1	0.014	0.224	0.03
Expansion	–	700	1.560	8	–	14	1	0.015	0.32	0.04
Tee (branch)	–	700	1.560	8	–	40	1	0.015	0.9	0.12
Main header:										
Gate valve (beta = 1, theta = 0)	–	900	2.005	10	–	7	1	0.014	0.112	0.01
Tee (flow through)	–	900	2.005	10	–	17	1	0.014	0.28	0.03
Tee (flow through)	–	900	2.005	10	–	17	1	0.014	0.28	0.03
Elbow (90)	–	900	2.005	10	–	25	1	0.014	0.42	0.04
Elbow (90)	–	900	2.005	10	–	25	1	0.014	0.42	0.04
Elbow (90)	–	900	2.005	10	–	25	1	0.014	0.42	0.04
Tee (flow through)	–	900	2.005	10	–	17	1	0.014	0.28	0.03
From main header to Stripper1:										
Piping (8" steel)	–	900	2.005	8	80	–	–	0.014	–	0.37
Elbow (90)	–	900	2.005	8	–	20	1	0.014	0.42	0.09
Elbow (90)	–	900	2.005	8	–	20	1	0.014	0.42	0.09
Check Valve[5]	–	900	2.005	8	–	–	1	0.014	–	0.50
Elbow (90)	–	900	2.005	8	–	20	1	0.014	0.42	0.09
Elbow (90)	–	900	2.005	8	–	20	1	0.014	0.42	0.09
Tee (flow through)	–	900	2.005	8	–	13	1	0.014	0.28	0.06
Elbow (90)	–	900	2.005	8	–	20	1	0.014	0.42	0.09
Elbow (90)	–	900	2.005	8	–	20	1	0.014	0.42	0.09
Elbow (90)	–	900	2.005	8	–	20	1	0.014	0.42	0.09
Sharp edged pipe exit	–	900	2.005	8	–	48	1	0.014	1	0.22

Notes:
Unless notes otherwise, friction factors and resistance coefficient formulas for steel pipe and fittings taken from *Flow of Fluids Through Valves, Fittings, and Pipe*, Crane Co., 1978
Friction loss formula taken from *Flow of Fluids Through Valves, Fittings, and Pipe*, Crane Co., 1978
Headloss through valves assumes valves are in fully open position.
Static head determined as follows: depth to pumping water level = -10.5 feet mean sea level (msl) and inlet to air stripper #1 is 147.3 feet msl. [147.3- -10.5 = 157.8]
These calculations based upon the maximum anticipated pumping rate from each individual well. The maximum total flow rate to the treatment system is 900 gpm.

(1) Headloss provided by Cla-Val for model 60-31
(2) Headloss provided by Henry Pratt Company nomograph for butterfly valves
(3) Headloss provided by Stainless Specialties, Inc.
(4) Headloss provided by Badger Meters for model Recordall Turbo 2000 Meter
(5) Headloss provided by Cla-Val for model 501

Preliminary Head Loss Calculations for RW-1RD, OU-1 Groundwater Treatment System
Former Unisys Facility, Great Neck, New York.



Description	ΔH (feet)	Design Flow (gpm)	Design Flow (cfs)	Inside Diameter (inches)	Pipe Length (feet)	Fitting/Valve Equivalent Length (feet)	Fitting/Valve Quantity	Friction Factor (f)	Resistance Coefficient (K)	Pressure Loss (psi)
Static head	157.8	--	--	--	--	--	--	--	--	--
From pump to well vault:										
Piping (6" steel)	--	250	0.557	3	200	--	--	0.015	--	10.40
Well vault:										
Piping (6" steel)	--	250	0.557	6	10	--	--	0.015	--	0.02
Elbow (90)	--	250	0.557	6	--	15	1	0.015	0.45	0.02
Clay-val[1]	--	250	0.557	6	--	--	1	0.015	--	1.00
Elbow (90)	--	250	0.557	6	--	15	1	0.015	0.45	0.02
Basket strainer[3]	--	250	0.557	6	--	--	1	0.015	--	0.50
Butterfly valve [2]	--	250	0.557	6	--	--	1	0.015	--	0.13
Flowmeter[4]	--	250	0.557	6	--	--	1	0.015	--	0.50
Expansion	--	250	0.557	6	--	20	1	0.015	0.60	0.03
From well vault to main header:										
Piping (8" steel)	--	700	1.560	8	90	--	--	0.015	--	0.27
Tee (branch)	--	700	1.560	8	--	40	1	0.015	0.9	0.12
Elbow (45)	--	700	1.560	8	--	11	1	0.014	0.224	0.03
Elbow (45)	--	700	1.560	8	--	11	1	0.014	0.224	0.03
Expansion	--	700	1.560	8	--	14	1	0.015	0.32	0.04
Main header:										
Gate valve (beta = 1, theta = 0)	--	900	2.005	10	--	7	1	0.014	0.112	0.01
Tee (flow through)	--	900	2.005	10	--	17	1	0.014	0.28	0.03
Tee (flow through)	--	900	2.005	10	--	17	1	0.014	0.28	0.03
Elbow (90)	--	900	2.005	10	--	25	1	0.014	0.42	0.04
Elbow (90)	--	900	2.005	10	--	25	1	0.014	0.42	0.04
Elbow (90)	--	900	2.005	10	--	25	1	0.014	0.42	0.04
Tee (flow through)	--	900	2.005	10	--	17	1	0.014	0.28	0.03
From main header to Stripper1:										
Piping (8" steel)	--	900	2.005	8	80	--	--	0.014	--	0.37
Elbow (90)	--	900	2.005	8	--	20	1	0.014	0.42	0.09
Elbow (90)	--	900	2.005	8	--	20	1	0.014	0.42	0.09
Check Valve[5]	--	900	2.005	8	--	--	1	0.014	--	0.50
Elbow (90)	--	900	2.005	8	--	20	1	0.014	0.42	0.09
Elbow (90)	--	900	2.005	8	--	20	1	0.014	0.42	0.09
Tee (flow through)	--	900	2.005	8	--	13	1	0.014	0.28	0.06
Elbow (90)	--	900	2.005	8	--	20	1	0.014	0.42	0.09
Elbow (90)	--	900	2.005	8	--	20	1	0.014	0.42	0.09
Elbow (90)	--	900	2.005	8	--	20	1	0.014	0.42	0.09
Sharp edged pipe exit	--	900	2.005	8	--	48	1	0.014	1	0.22
Total Static Head (feet)										
Total Losses (feet)										
Total Static Head plus Losses with Safety Factor of 1.3										
Total Discharge Head (feet)										

Notes:

Unless notes otherwise, friction factors and resistance coefficient formulas for steel pipe and fittings taken from *Flow of Fluids Through Valves, Fittings, and Pipe*, Crane Co., 1978

Friction loss formula taken from *Flow of Fluids Through Valves, Fittings, and Pipe*, Crane Co., 1978

Headloss through valves assumes valves are in fully open position.

Static head determined as follows: depth to pumping water level = -10.5 feet mean sea level (msl) and inlet to air stripper #1 is 147.3 feet msl. [147.3- -10.5 = 157.8]

These calculations based upon the maximum anticipated pumping rate from each individual well. The maximum total flow rate to the treatment system is 900 gpm.

(1) Headloss provided by Cla-Val for model 60-31

(2) Headloss provided by Henry Pratt Company nomograph for butterfly valves

(3) Headloss provided by Stainless Specialties, Inc.

(4) Headloss provided by Badger Meters for model Recordall Turbo 2000 Meter

(5) Headloss provided by Cla-Val for model 501

Appendix B

Tower Air Stripping System

LAYNE CHRISTENSEN COMPANY
WATER TREATMENT DIVISION

CONFIDENTIAL
08/20/1999

Project	Former Manufacturing Facility
Site	Long Island, NY
Packing	2" Tripacks
Date	08/20/1999

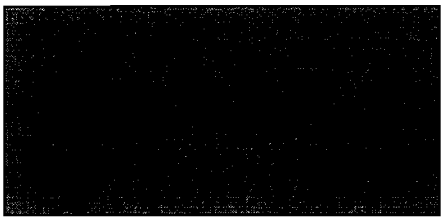
ID Number	12
Compound	c-12-DCE
Temp (F)	50
Kla (1/sec)	0.013347
Henry's (atm)	95
Air:Water	86.0
Diameter (ft)	6.37
Water Flow (gpm)	800.0
LLR (gpm/ft^2)	25.3
Influent (ug/l)	4500.0
Safety (%)	1.10

Packing Height (ft)	Effluent (ug/l)
1	3726.5
2	3105.3
3	2602.3
4	2190.4
5	1850.4
6	1567.9
7	1331.9
8	1133.5
9	966.8
10	825.7
11	706.0
12	604.4
13	517.8
14	444.0
15	381.0
16	327.1
17	280.9
18	241.4
19	207.5
20	178.4
21	153.4
22	132.0
23	113.6
24	97.7
25	84.1
26	72.4
27	62.3
28	53.7
29	46.2
30	39.8
31	34.3
32	29.5
33	25.4
34	21.9
35	18.9
36	16.2
37	14.0
38	12.0
39	10.4
40	8.9
41	7.7
42	6.6
43	5.7
44	4.9
45	4.2
46	3.7
47	3.1
48	2.7
49	2.3
50	2.0
51	1.7

Appendix C

Total Discharge Head Calculations,
Clearwell Pumps

Preliminary Head Loss Calculations for Discharge from Clearwell 1 to Air Stripper 2, OU-1 Groundwater Treatment System
Former Unisys Facility, Great Neck, New York.



Description	ΔH (feet)	Design Flow (gpm)	Design Flow (cfs)	Inside Diameter (inches)	Pipe Length (feet)	Fitting/Valve Equivalent Length (feet)	Fitting/Valve Quantity	Friction Factor (f)	Resistance Coefficient (K)	Pressure Loss (psi)
From clearwell1 to air stripper2:										
Static head	35	--	--	--	--	--	--	--	--	--
Piping (8" steel)	--	1000	2.228	8	49	--	--	0.014	--	0.28
Elbow (90)	--	1000	2.228	8	--	20	1	0.014	0.42	0.12
Butterfly valve [1]	--	1000	2.228	8	--	--	1	0.014	--	0.20
Elbow (90)	--	1000	2.228	8	--	20	1	0.014	0.42	0.12
Check Valve[2]	--	1000	2.228	8	--	--	1	0.014	--	0.75
Elbow (90)	--	1000	2.228	8	--	20	1	0.014	0.42	0.12
Elbow (90)	--	1000	2.228	8	--	20	1	0.014	0.42	0.12
Elbow (90)	--	1000	2.228	8	--	20	1	0.014	0.42	0.12

Notes:

These calculations are for discharge from clearwell1 to air stripper2.

Unless noted otherwise, friction factors and resistance coefficient formulas for steel pipe and fittings taken from *Flow of Fluids Through Valves, Fittings, and Pipe*, Crane Co., 1978

Friction loss formula taken from *Flow of Fluids Through Valves, Fittings, and Pipe*, Crane Co., 1978

Headloss through valves assumes valves are in fully open position.

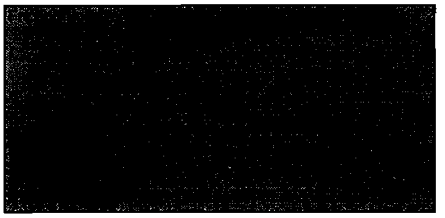
Static head determined as follows: depth to clearwell1 pump inlet to inlet of air stripper2 = 28 feet to air stripper2+ 7 foot to centerline of pump inlet = 35 feet.

[1] Headloss provided by Henry Pratt Company nomograph for butterfly valves

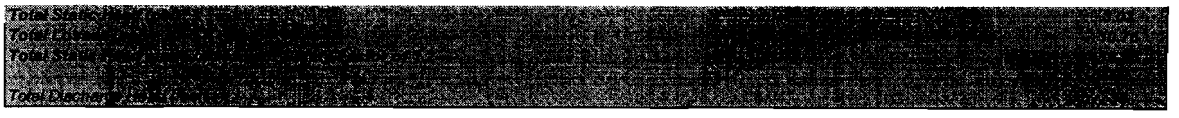
[2] Headloss provided by Cla-Val for model 501

Preliminary Head Loss Calculations for Discharge from Clearwell 2 to Off-Site Diffusion Wells, OU1 Groundwater Treatment System
Former Lockheed Martin/Unisys Facility, Great Neck, New York.

By:	Date:
Chkd:	Date:
Rev:	Date:



Description	ΔH (feet)	Design Flow (gpm)	Design Flow (cfs)	Inside Diameter (inches)	Pipe Length (feet)	Fitting/Valve Equivalent Length (feet)	Fitting/Valve Quantity	Friction Factor (f)	Resistance Coefficient (K)	Pressure Loss (psi)	Dead Head Pressure (psi)
From pump inlet to discharge head:											
Static head	7	--	--	--	--	--	--	--	--	--	
Piping (8" steel)	--	1000	2.228	8	6	--	--	0.014	--	0.03	
From discharge head through main header:											
Piping (8" steel)	--	1000	2.228	8	10	--	--	0.014	--	0.06	
Butterfly valve [1]	--	1000	2.228	8	--	--	1	0.014	--	0.20	
Check Valve[2]	--	1000	2.228	8	--	--	1	0.014	--	0.75	
Flowmeter[3]	--	1000	2.228	8	--	--	1	0.014	--	0.20	
Tee (flow through)	--	1000	2.228	8	--	13	1	0.014	0.28	0.08	
Butterfly valve [1]	--	1000	2.228	8	--	--	1	0.014	--	0.20	
Elbow (90)	--	1000	2.228	8	--	20	1	0.014	0.42	0.12	
Expansion	--	1000	2.228	8	--	15	1	0.014	0.32	0.09	
Piping (10" steel)	--	1000	2.228	10	2685	--	--	0.014	--	5.07	
Elbow (90)	--	1000	2.228	10	--	25	1	0.014	0.42	0.05	
Elbow (90)	--	1000	2.228	10	--	25	1	0.014	0.42	0.05	
Tee (branch)	--	1000	2.228	10	--	50	1	0.014	0.84	0.09	
Elbow (45)	--	1000	2.228	10	--	13	1	0.014	0.224	0.03	
Elbow (45)	--	1000	2.228	10	--	13	1	0.014	0.224	0.03	
Elbow (90)	--	1000	2.228	10	--	25	1	0.014	0.42	0.05	
From main header to diffusion well vaults:											
Piping (8" steel)	--	1000	2.228	8	320	--	--	0.014	--	1.84	
Contraction	--	1000	2.228	8	--	19	1	0.014	0.41	0.11	
Tee (flow through)	--	1000	2.228	8	--	13	1	0.014	0.28	0.08	
Tee (flow through)	--	1000	2.228	8	--	13	1	0.014	0.28	0.08	
Elbow (90)	--	1000	2.228	8	--	20	1	0.014	0.42	0.12	
From vault entrance to diffusion wells:											
Gate valve (beta = 1, theta = 0)	--	1000	2.228	8	--	16	3	0.014	0.112	0.09	
Flowmeter[3]	--	1000	2.228	8	--	--	3	0.014	--	0.20	
Elbow (90)	--	1000	2.228	8	--	60	3	0.014	0.42	0.35	
Sharp edged pipe exit	--	1000	2.228	8	--	143	3	0.014	1	0.82	



Notes:

These calculations are for discharge to off-site diffusion wells

Unless notes otherwise, friction factors and resistance coefficient formulas for steel pipe and fittings taken from *Flow of Fluids Through Valves, Fittings, and Pipe*, Crane Co., 1978

Friction loss formula taken from *Flow of Fluids Through Valves, Fittings, and Pipe*, Crane Co., 1978

Headloss through valves assumes valves are in fully open position.

Static head determined as follows: depth to pump intake = 7 feet.

(1) Headloss provided by Henry Pratt Company nomograph for butterfly valves

(2) Headloss provided by Cla-Val for model 501

(3) Headloss provided by Badger Meters for model Recordall Turbo 2000 Meter

Appendix D

Clearwell Sizing Calculations

Preliminary Clearwell 1 Design Calculations, OU-1 Groundwater Treatment System
Former Lockheed Unisys Facility, Great Neck, New York.

Clearance from water operating level to bottom of stripping tower(per Layne):	6 inches	0.5 feet
Minumum submergance for vertical turbine (per POK):	14 inches	1.2 feet
Clearance from bottom of clearwell to pump intake (per POK):	6 inches	0.5 feet
Absolute Minimum Operating Level in Clearwell (LSLL):	20 inches	1.7 feet
Minimum Normal Operating Level in Clearwell (LSL):	26 inches	2.2 feet
Normal Operating Level in Clearwell (LSN):	32 inches	2.7 feet
Maximum Normal Operating Level in Clearwell (LSH):	38 inches	3.2 feet
Absolute Maximum Operating Level in Clearwell (LSHH):	44 inches	3.7 feet
Design operating level in clearwell:	44 inches	3.7 feet
Design operating volume for stripper internals (per Layne):	1,000 gallons	
Required Set - Down of Stripper for Height Requirements:		2.25 feet

Calculated Volumes and Heads Above Operating Level Baseline
for Clearwell, Following Shutdown

Clearwell Volume	Clearwell Head
1000	0.65

Clearwell Width (feet)	Clearwell Length (feet)	Capacity per Foot (gallons)	Clearwell Depth Required for Shutdown (feet)	Minimum Clearwell Depth[1] (feet)	Clearwell Design Height (feet)	Clearwell Operating Volume (gallons)	Residence Time (min)
9	23	1548	0.6	7.1	8.0	5677	6.3

[1] Minimum Clearwell Depth equals the design operating level + depth added following shutdown + clearance of water operating level to bottom of stripping tower+Required Set-Down of Stripper for Height Requirements..

LSLL	Level Switch Low Low
LSL	Level Switch Low
LSN	Level Switch Normal
LSH	Level Switch High
LSHH	Level Switch High High
POK	Pumps of Oklahoma

Preliminary Clearwell 2 Design Calculations, OU-1 Groundwater Treatment System
Former Unisys Facility, Great Neck, New York.

Clearance from water operating level to bottom of stripping tower(per Layne):	6 inches	0.5 feet
Minumum submergance for vertical turbine (per POK):	14 inches	1.2 feet
Clearance from bottom of clearwell to pump intake (per POK):	6 inches	0.5 feet
Absolute Minimum Operating Level in Clearwell (LSLL):	20 inches	1.7 feet
Minimum Normal Operating Level in Clearwell (LSL):	26 inches	2.2 feet
Normal Operating Level in Clearwell (LSN):	32 inches	2.7 feet
Maximum Normal Operating Level in Clearwell (LSH):	38 inches	3.2 feet
Absolute Maximum Operating Level in Clearwell (LSHH):	44 inches	3.7 feet
Design operating level in clearwell:	44 inches	3.7 feet
Design operating volume for stripper internals (per Layne):	1,000 gallons	
Required Set - Down of Stripper for Height Requirements:		2.25 feet

Calculated Volumes and Heads Above Operating Level Baseline
for Clearwell, Following Shutdown

Clearwell Volume	Clearwell Head
1000	0.53

Clearwell Width (feet)	Clearwell Length (feet)	Capacity per Foot (gallons)	Clearwell Depth Required for Shutdown (feet)	Minimum Clearwell Depth[1] (feet)	Clearwell Design Height (feet)	Clearwell Operating Volume (gallons)	Residence Time (min)
11	23	1892	0.5	6.9	7.0	6939	7.7

[1] Minimum Clearwell Depth equals the design operating level + depth added following shutdown + clearance of water operating level to bottom of stripping tower+Required Set-Down of Stripper for Height Requirements..

LSLL	Level Switch Low Low
LSL	Level Switch Low
LSN	Level Switch Normal
LSH	Level Switch High
LSHH	Level Switch High High
POK	Pumps of Oklahoma

Appendix E

Preliminary Air Emissions Modeling

Table 1. New York State Department of Environmental Conservation Air Guide 1 Worksheet, Lockheed Martin Corporation, Great Neck, New York.

AIR GUIDE 1 - WORKSHEET

Version: Update June 8, 1994 from NYSDEC Air Guide 1 Appendix B (April 4, 1994)

DATE:	03/24/00
JOB NAME:	Lockheed Martin
JOB NUMBER:	NY001227.0010
LOCATION:	Great Neck, New York

AIR EMISSION POINT

Proposed Air Stripping System

MAXIMUM VAPOR FLOWRATE:	7225	acfm
DISCHARGE TEMPERATURE:	60	Degrees F
AMBIENT TEMPERATURE:	50	Degrees F
BUILDING HEIGHT:	17.66	feet
MAX BUILDING WIDTH:	38	feet
PHYSICAL STACK HEIGHT:	30	feet
STACK DIAMETER:	24	inches
CAPPED STACK EXIT? (Y/N)	N	
MAXIMUM EXIT VELOCITY:	38.33	feet/sec
STACK / BUILDING RATIO(Hs/Hb):	1.7	
STACK REDUCTION FACTOR:	0.75	
DIST. TO PROP. LINE:	70	feet

note: If greater than 3 times building height ignore cavity impacts.

EFFECTIVE STACK HEIGHT: 42.4 feet

(INCLUDING MOMENTUM AND BUOYANCY RISE CREDITS)

CALCULATED BLDG. CAVITY HEIGHT: 26.49 feet

THE PHYSICAL STACK HEIGHT IS GREATER THAN THE BLDG CAVITY HEIGHT, THEREFORE:

NO ANNUAL OR SHORT-TERM CAVITY IMPACTS OCCUR FROM THIS SOURCE

CONTAMINANT	CAS #	LOADING* (lbs/hr)	(lbs/yr)
1,2 - DICHLOROETHENE	540-59-0	1.02E-01	894.40
VINYL CHLORIDE	75-01-4	1.66E-03	14.51
TETRACHLOROETHENE	127-18-4	3.06E-03	26.83
TRICHLOROETHENE	79-01-6	2.16E-03	18.88
1,1 - DICHLOROETHENE	75-35-4	6.80E-05	0.60
FREON 113	76-13-1	8.85E-04	7.75

*LOADING IS BASED UPON A 95% REMOVAL EFFICIENCY THROUGH THE VPGAC TREATMENT UNIT

STANDARD POINT SOURCE DISCHARGE METHOD SUMMARY

(Stack Reduction)

CONTAMINANT	AGC LIMIT (ug/m^3)	Ca (ug/m^3)	CP (ug/m^3)	CST (ug/m^3)	SGC LIMIT (ug/m^3)
1,2 - DICHLOROETHENE	1.90E+03	8.76E-01	1.00E-04	4.88E-03	1.90E+05
VINYL CHLORIDE	2.00E-02	1.42E-02	1.62E-06	7.91E-05	1.30E+03
TETRACHLOROETHENE	1.20E+00	2.63E-02	3.00E-06	1.46E-04	4.00E+04
TRICHLOROETHENE	4.50E-01	1.85E-02	2.11E-06	1.03E-04	3.30E+04
1,1 - DICHLOROETHENE	2.00E-02	5.84E-04	6.66E-08	3.25E-06	2.00E+03
FREON 113	3.00E+04	7.59E-03	8.67E-07	4.23E-05	1.80E+06

*LOADING IS BASED UPON A 9

CALCULATED MOMENTUM FLUX: 1441.01 feet^4/sec^2

CALCULATED BUOYANCY FLUX: 0.20 feet^4/sec^2

THERE IS SOME MOMENTUM CREDIT BECAUSE 1.5< Hs/Hb <2.5

MOMENTUM PLUME RISE CREDIT: 12.42

THERE IS NO BUOYANCY CREDIT BECAUSE Hs/HB<2.5

BUOYANCY FINAL RISE CREDIT: 0.00 feet

Appendix F

Air Permit Application

New York State Department of Environmental Conservation
Air Facility Registration

DECID
- - - - - - - - -

Owner / Firm

Taxpayer ID

Name	Lockheed Martin Corporation		
Street Address	100 South Charles Street, Suite 1400		
City / Town / Village: Baltimore	State or Province: MD	Country: USA	Zip/Mail Code: 21201

Owner/Firm Contact

Name	Phone No.
Gene Matsushita	(410) 468-1000

Facility

Name	Lockheed Martin Corporation	
Location Address	Proposed facility located along south side of Marcus Ave, 2300' east of Lakeville Road and Marcus Ave intersection.	
☐ City / ☑ Town / ☐ Village: Great Neck, NY		Zip: 11020

Facility Information

Total Number of Emission Points: 1

☐ Cap by Rule

Description

Proposed groundwater treatment facility consists of two (2) air stripping towers with one emission source. Air stripper off-gas shall be treated with vapor phase granular activated carbon prior to discharge. Proposed facility is exempt from registration pursuant to 6 NYCRR Part 201-3.3 (c) (29)

Standard Industrial Classification Codes

HAP CAS Numbers

75- 01 - 4	127 - 18 - 4	79 - 01 - 6	- -	- -	- -
- -	- -	- -	- -	- -	- -

Applicable Federal and New York State Requirements (Part No.s)

201-3.3 (c) (29)				

Certification

I certify that this facility will be operated in conformance with all provisions of existing regulations.

Responsible Official	Title
Signature	Date ____ / ____ / ____

(7/29/96)

Appendix G

SPDES Permit Application

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section I - Permittee and Facility Information

Please type or print the requested information.

1. Current Permit Information (leave blank if for new discharge)

SPDES Number:	DEC Number:

2. Permit Action Requested: (Check applicable box)

[X] A **NEW** proposed discharge

[ ] An **EBPS INFORMATION REQUEST** response

[ ] A **RENEWAL** of an existing SPDES permit

[ ] A **MODIFICATION** of the existing permit

[ ] An **EXISTING** discharge currently without permit

Does this request include an increase in the quantity of water discharged from your facility to the waters of the State?

[ ] **YES** - Describe the increase:

[ ] **NO** - Go to Item 3. below.

3. Permittee Name and Address

Name	Attention
Lockheed Martin Corporation	Gene Matsushita
Street Address	
100 South Charles Street, Suite 1400	
City or Village	**State** / **ZIP Code**
Baltimore	MD / 21201

4. Facility Name, Address and Location

Name			
OU-1 Treatment Facility			
Street Address		**P.O. Box**	
Proposed facility located along Marcus Ave. 2300 feet East of Marcus Ave/Lake Road Inter.			
City or Village	**State**	**ZIP Code**	
North Hempstead	NY	11020	
Town	**County**		
Great Neck	Nassau		
Telephone	**FAX**	**NYTM - E**	**NYTM - N**
Tax Map Info (New York City, Nassau County and Suffolk County only)			
Section	**Block**	**Subblock**	**Lot**
			300

5. Facility Contact Person

Name	Title	
Glenn Netuschil	Project Engineer	
Street Address		**P.O. Box**
88 Duryea Road		
City or Village	**State**	**ZIP Code**
Melville	NY	11747
Telephone	**FAX**	**E-Mail or Internet**
(631) 249-7600	(631) 249-7610	gnetusch@gmgw.com

6. Discharge Monitoring Report (DMR) Mailing Address

Mailing Name		
Glenn Netuschil		
Street Address		**P.O. Box**
88 Duryea Road		
City or Village	**State**	**ZIP Code**
Melville	NY	11747
Telephone	**FAX**	**E-Mail or Internet**
(631) 249-7600	(631) 249-7610	gnetusch@gmgw.com
Name and Title of person responsible for signing DMRs		**Signature**
Glenn Netuschil Project Engineer		

INDUSTRIAL APPLICATION FORM NY-2C
Section I - Permittee and Facility Information

Facility Name: OU-1 Treatment Facility	SPDES Number:

7. Summarize the outfalls present at the facility:

Outfall Number	Receiving Water	Type of discharge
001	Groundwater	Effluent from groundwater remeidaiton system
002	Groundwater	Effluent from groundwater remediation system
003	Groundwater	Effluent from groundwater remediation system

8. Map of Facility and Discharge Locations:

Provide a detailed map showing the location of the facility, all buildings or structures present, wastewater discharge systems, outfall locations into receiving waters, nearby surface water bodies, water supply wells, and groundwater monitoring wells, and attach it to this application. Also submit proof, either by indication on the map or other documentation, that a right of way for the discharges exists from the facility property to a public right of way.

9. Water Flow Diagram:

See Attached Figure 3

INDUSTRIAL APPLICATION FORM NY-2C
Section I - Permittee and Facility Information

Facility Name:	SPDES Number:
OU-1 Treatment Facility	

10. Nature of business: (Describe the activities at the facility and the date(s) that operation(s) at the facility commenced)

Proposed facility will consist of groundwater treatment system comprised of two (2) air stripping towers. Treatment system operation is planned to begin in spring of 2000.

11. List the 4-digit SIC codes which describe your facility in order of priority:

Priority 1	Description:	Priority 3	Description:
Priority 2	Description:	Priority 4	Description:

12. Is your facility a primary industry as listed in Table 1 of the instructions?

[ ] YES - Complete the following table.

[X] NO - Go to Item 13. below.

Industrial Category	40 CFR		Industrial Category	40 CFR	
	Part	Subpart		Part	Subpart

13. Does this facility manufacture, handle, or discharge recombinant-DNA, pathogens, or other potentially infectious or dangerous organisms?

[ ] YES - Attach a detailed explanation to this application.

[X] NO - Go to Item 14 below.

14. Is storm runoff or leachate from a material storage area discharged by your facility?

[ ] YES - Complete the following table, and show the location of the stockpile(s) and discharge point(s) on the diagram in Item 9.

[X] NO - Go to Item 15 on the following page.

Size of area	Type(s) of material stored	Quantity of material stored	Runoff control devices

INDUSTRIAL APPLICATION FORM NY-2C
Section I - Permittee and Facility Information

Facility Name:	SPDES Number:
OU-1 Treatment Facility	

15. Facility Ownership: (Place an "X" in the appropriate box)

Corporate [X] Sole Proprietorship [ ] Partnership [ ] Municipal [ ] State [ ] Federal [ ] Other [ ]

Are any of the discharges applied for in this application on Indian lands? Yes [ ] No [ ]

16. List information on any other environmental permits for this facility:

Issuing Agency	Permit Type	Permit Number	Permit Status		
			Active	Applied for	Inactive
NYSDEC	AIR			X	

17. Laboratory Certification:

Were any of the analyses reported in Section III of this application performed by a contract laboratory or a consulting firm?

[ ] YES - Complete the following table.

[X] NO - Go to Item 18 below.

Name of laboratory or consulting firm	Address	Telephone (area code and number)	Pollutants analyzed

18. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and official title (type or print)		Date signed
Glenn Netuschil		
Signature	Telephone number	FAX number
	(631) 249-7600	(631) 249-7610

INDUSTRIAL APPLICATION FORM NY-2C
Section I - Permittee and Facility Information

Facility Name:	SPDES Number:
OU-1 Treatment Facility	

19. Industrial Chemical Survey (ICS)

Complete all information for those substances your facility has used, produced, stored, distributed, or otherwise disposed of in the past five (5) years at or above the threshold values listed in the instructions. Include substances manufactured at your facility, as well as any substances that you have reason to know or believe present in materials used or manufactured at your facility. Do not include chemicals used only in analytical laboratory work, or small quantities of routine household cleaning chemicals. Enter the name and CAS number for each of the chemicals listed in Tables 6-10 of the instructions, and the table number which lists the chemical. You may use ranges (e.g. 10-100 lbs., 100-1000 lbs., 1000-10000 lbs., etc.) to describe the quantities used on an annual basis as well as for the amount presently on hand. For those chemicals listed in Tables 6, 7, or 8 which are indicated as being potentially present in the discharge from one or more outfalls at the facility, indicate which outfalls may be affected in the appropriate column below, and include sampling results in Section III of this application for each of the potentially affected outfalls. Make additional copies of this sheet if necessary.

Name of Substance	Table	CAS Number	Average Annual Usage	Amount Now On Hand	Units (gallons, lbs, etc)	Purpose of Use (see codes in Table 2 of instructions)	Present in Discharge? (Outfall(s)?)
Not Applicable	New	Facility					

This completes Section I of the SPDES Industrial Application Form NY-2C. Section II, which requires specific information for each of the outfalls at your facility, and Section III, which requires sampling information for each of the outfalls at your facility, must also be completed and submitted with this application.

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section II - Outfall Information

Please type or print the requested information.

Facility Name:	SPDES Number:
OU-1 Treatment Facility	

1. Outfall Number and Location

Outfall No.:		
001		
Latitude ° ' "	Longitude ° ' "	Receiving Water
		Groundwater

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units MGD	Units GPM	Units Other (specify)		Volume/Flow	Units MGD	Units GPM	Units Other (specify)
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge	243		X	
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water				
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
128 MG	0.24 MGD	0.35 MGD	0.43 MGD	0.43 MGD

INDUSTRIAL APPLICATION FORM NY-2C
Section II - Outfall Information

Facility Name:	Outfall No.:
OU-1 Treatment Facility	001
	SPDES Number:

5. Is this a seasonal discharge?

[ ] YES - Complete the following table.

[X] NO - Go to Item 6 below.

Operations contributing flow (list)	Discharge frequency		Flow				
	Batches per year	Duration per batch	Flow rate per day		Total volume per discharge	Units	Duration (Days)
			LTA	Daily Max			

6. Water Supply Source (indicate all that apply)

	Name or owner of water supply source	Volume or flow rate	Units (check one)		
Municipal Supply			MGD	GPD	GPM
Private Surface Water Source			MGD	GPD	GPM
Private Supply Well	Lockheed Martin Corporation	730	MGD	GPD	X GPM
Other (specify)			MGD	GPD	GPM

7. Outfall configuration: (Surface water discharges only)

A. Where is the discharge point located with respect to the receiving water?

In the streambank: [ ]

In the stream: [ ]

Within a lake or ponded water: [ ]

Within an estuary: [ ] Attach Supplement C, MIXING ZONE REQUIREMENTS FOR DISCHARGES TO ESTUARIES.

Discharge is equipped with diffuser: [ ] Attach description, including configuration and plan drawing of diffuser, if used.

B. If located in a stream, approximately what percentage of stream width from shore is the discharge point located?

10% [ ] 25% [ ] 50% [ ] Other: [ ]

C. If located in a stream, describe the stream geometry in the general vicinity of the discharge point, under low flow conditions:

Stream width	Stream depth	Stream velocity
Feet	Feet	Feet/Sec

Are the results of a mixing/diffusion study attached? [ ] YES [ ] NO

INDUSTRIAL APPLICATION FORM NY-2C
Section II - Outfall Information

Facility Name:	Outfall No.:
OU-1 Treatment Facility	001
	SPDES Number:

8. Thermal Discharge Criteria

Is your facility one of the applicable types of facilities listed in the instructions, and does the temperature of this discharge exceed the receiving water temperature by greater than three (3) degrees Fahrenheit?

[ ] YES - Complete the following table. [ ] Information on the intake and discharge configuration of this outfall is attached.

[X] NO - Go to Item 9. below.

Discharge Temperature, deg. F			Duration of maximum discharge temperature		Dates of maximum discharge temperature		Maximum flow rate	Discharge configuration (e.g. subsurface, surface, effluent diffuser, diffusion well, etc.)
Average change in temperature (delta T)	Maximum change in temperature (delta T)	Maximum temperature	hours per day	days per year	From	To	MGD	

9. Are any water treament chemicals or additives that are used by your facility subsequently discharged through this outfall?

[ ] YES - Complete the following table and complete pages 1 of 3 and 2 of 3 of Form WTCFX for each water treatment chemical listed.

[X] NO - Go to Item 10. below.

Manufacturer	WTC trade name	Manufacturer	WTC trade name

10. Has any biological test for acute or chronic toxicity been performed on this outfall or on the receiving water in relation to this outfall in the past three (3) years?

[ ] YES - Complete the following table.

[X] NO - Go to Item 11. on the following page.

Water tested	Purpose of test	Type of test	Chronic or Acute?	Subject species	Testing date(s)		Submitted? (Date)
					Start	Finish	

INDUSTRIAL APPLICATION FORM NY-2C
Section II - Outfall Information

Facility Name:	Outfall No.:
OU-1 Treatment Facility	001
	SPDES Number:

11. Is the discharge from this outfall treated to remove process wastes, water treatment additives, or other pollutants?

[X] YES - Complete the following table. Treatment codes are listed in Table 4.

[ ] NO - Go to Item 12 below.

Treatment process	Treatment Code(s)	Treatment used for the removal of:	Design Flow Rate (include units)
Recovered groundwater is treated by two (2) Air Stripping Towers in Series.	1-Y	Chlorinated Solvent	730 gpm

12. Does this facility have either a compliance agreement with a regulating agency, or have planned changes in production, which will materially alter the quantity and/or quality of the discharge from this outfall?

[X] YES - Complete the following table.

[ ] NO - Go to Section III on the following page.

Description of project	Subject to Condition or Agreement in existing permit or consent order? (List)	Change due to production increase?	Completion Date(s)	
			Required	Projected
Groundwater remediation per NYSDEC Consent Order	Consent Order # WI-0787-96-12			9/00

This completes Section II of the SPDES Industrial Application Form NY-2C. Section I, which requires general information regarding your facility, and Section III, which requires sampling information for each of the outfalls at your facility, must also be completed and submitted with this application.

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name:	SPDES No.:	Outfall No.:
OU-1 Treatment Facility		001

1. Sampling Information - Conventional Parameters

Provide the analytical results of at least one analysis for every pollutant in this table. If this outfall is subject to a waiver as listed in Table 5 of the instructions for one or more of the parameters listed below, provide the results for those parameters which are required for this type of outfall.

PLEASE PRINT OR TYPE IN THE UNSHADED AREAS ONLY. You may report some or all of this information on separate sheets (using the same format) instead of completing these pages.

Pollutant	a. Maximum daily value		b. Maximum 30 day value		c. Long term average		d. No. of samples	e. Units		f. Effluent Gross Value		
	1. Concentration	2. Mass	1. Concentration	2. Mass	1. Concentration	2. Mass		1. Concentration	2. Mass	1. Concentration	2. Mass	
a. Biochemical Oxygen Demand, 5 day (BOD)	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
b. Chemical Oxygen Demand (COD)	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
c. Total Suspended Solids (TSS)	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
d. Total Dissolved Solids (TDS)	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
e. Oil & Grease	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
f. Chlorine, Total Residual (TRC)	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
g. Total Organic Nitrogen (TON)	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
h. Ammonia (as N)	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
i. Flow	Value .43 MG		Value 13 MG		Value 383 MG		N/A			Value		
j. Temperature, winter	Value N/A		Value N/A		Value N/A		N/A			Value		
k. Temperature, summer	Value N/A		Value N/A		Value N/A		N/A			Value		
l. pH	Minimum N/A	Maximum N/A	Minimum N/A	Maximum N/A			N/A			Minimum	Maximum	

2. Sampling Information - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

a. Primary Industries: i. Does the discharge from this outfall contain process wastewater?

- [ ] **Yes** - Go to Item ii. below.
- [X] **No** - Go to Item b.below.

ii. Indicate which GC/MS fractions have been tested for: Volatiles: [ ] Acid: [ ] Base/Neutral: [ ] Pesticide: [ ]

b. All applicants: i. Do you know or have reason to believe that any of the pollutants listed in Tables 6, 7, or 8 of the instructions are present in the discharge from this outfall?

- [X] **Yes** - Concentration and mass data attached.
- [ ] **No** - Go to Item ii. below.

ii. Do you know or have reason to believe that any of the pollutants listed in Table 9 or Table 10 of the instructions, or any other toxic, harmful, or injurious chemical substances not listed in Tables 6-10, are present in the discharge from this outfall?

- [ ] **Yes** - Source or reason for presence in discharge attached
- [ ] **Yes** - Quantitative or qualitative data attached
- [ ] **No**

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name:	SPDES No.:	Outfall No.:
OU-1 Treatment Facility		001

3. Projected Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results of at least one analysis for each pollutant that you know or have reason to believe is present in this discharge, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a on the preceding page.

List the name and CAS number for each pollutant that you know or have reason to believe is present in the discharge from this outfall. For each pollutant listed from Tables 6, 7, or 8, provide the results of at least one analysis for that pollutant and determine the mass discharge based on the flow rate reported in Item 5. For each pollutant listed from Table 9, or any other toxic pollutant not listed in Tables 6-10, you must provide concentration and mass data (if available) and/or an explanation for their presence in the discharge. Make as many copies of this table as necessary for each outfall.

Page of

Pollutant and CAS Number	Effluent data												
	a. Maximum daily value		b. Maximum 30 day value (if available)		c. Long term average value (if available)		d. Number of samples	e. Units	f. Mass data (optional)			g. Source(s) of information	h. Believed present (optional)
	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass	(1) Concentration	(2) Mass			(1) Maximum daily value	(2) Maximum 30 day value	(3) Long term average value		
Cis-1,2 Dichloroethylene CAS Number: 00156-59-2	<5	NA	<5	NA	ug/L	NA							
Vinyl Chloride CAS Number: 00075-01-4	<2	NA	<2	NA	ug/L	NA							
Tetrachloroethylene CAS Number: 00127-18-4	<5	NA	<5	NA	ug/L	NA							
Trichloroethylene CAS Number: 00079-01-6	<5	NA	<5	NA	ug/L	NA							
Vinylidine Chloride CAS Number: 00075-35-4	<5	NA	<5	NA	ug/L	NA							
Freon 113 CAS Number: 00076-13-1	<5	NA	<5	NA	ug/L	NA							
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: OU-1 Treatment Facility	SPDES No.:	Outfall No.: 001

4. Existing Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results for the last three (3) years for each pollutant that you know or have reason to believe present in this discharge from this outfall, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a for this discharge.

Make as many copies of this table as necessary for each outfall. You can list the results from 24 sampling dates on each copy of this page.		Parameter name:	Parameter name:	Parameter name:	Parameter name:	Parameter name:	Parameter name:	Parameter name:
Page Of		CAS Number:	CAS Number:	CAS Number:	CAS Number:	CAS Number:	CAS Number:	CAS Number:
Date	Flow rate	Concentration	Concentration	Concentration	Concentration	Concentration	Concentration	Concentration
	Units:	Units:	Units:	Units:	Units:	Units:	Units:	Units:
None Availabile - New Facility								

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section II - Outfall Information

Please type or print the requested information.

Facility Name:	SPDES Number:
OU-1 Treatment Facility	

1. Outfall Number and Location

Outfall No.:		
002		
Latitude ° ' "	Longitude ° ' "	Receiving Water
		Groundwater

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units MGD	Units GPM	Units Other (specify)		Volume/Flow	Units MGD	Units GPM	Units Other (specify)
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge	243		X	
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water				
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
128 MG	0.24 MGD	0.35 MGD	0.43 MGD	0.43 MGD

INDUSTRIAL APPLICATION FORM NY-2C
Section II - Outfall Information

Facility Name: OU-1 Treatment Facility	Outfall No.: 002
	SPDES Number:

5. Is this a seasonal discharge?

[ ] YES - Complete the following table.

[X] NO - Go to Item 8 below.

Operations contributing flow (list)	Discharge frequency		Flow				
	Batches per year	Duration per batch	Flow rate per day LTA	Flow rate per day Daily Max	Total volume per discharge	Units	Duration (Days)

6. Water Supply Source (indicate all that apply)

	Name or owner of water supply source	Volume or flow rate	Units (check one)		
Municipal Supply			MGD	GPD	GPM
Private Surface Water Source			MGD	GPD	GPM
Private Supply Well	Lockheed Martin Corporation	730	MGD	GPD	X GPM
Other (specify)			MGD	GPD	GPM

7. Outfall configuration: (Surface water discharges only)

A. Where is the discharge point located with respect to the receiving water?

In the streambank: [ ]

In the stream: [ ]

Within a lake or ponded water: [ ]

Within an estuary: [ ] Attach Supplement C, MIXING ZONE REQUIREMENTS FOR DISCHARGES TO ESTUARIES.

Discharge is equipped with diffuser: [ ] Attach description, including configuration and plan drawing of diffuser, if used.

B. If located in a stream, approximately what percentage of stream width from shore is the discharge point located?

10% [ ] 25% [ ] 50% [ ] Other: [ ]

C. If located in a stream, describe the stream geometry in the general vicinity of the discharge point, under low flow conditions:

Stream width	Stream depth	Stream velocity
Feet	Feet	Feet/Sec

Are the results of a mixing/diffusion study attached? [ ] YES [ ] NO

INDUSTRIAL APPLICATION FORM NY-2C
Section II - Outfall Information

Facility Name:	Outfall No.:
OU-1 Treatment Facility	002
	SPDES Number:

8. Thermal Discharge Criteria

Is your facility one of the applicable types of facilities listed in the instructions, and does the temperature of this discharge exceed the receiving water temperature by greater than three (3) degrees Fahrenheit?

[ ] YES - Complete the following table. [ ] Information on the intake and discharge configuration of this outfall is attached.

[X] NO - Go to Item 9. below.

Discharge Temperature, deg. F			Duration of maximum discharge temperature		Dates of maximum discharge temperature		Maximum flow rate	Discharge configuration (e.g. subsurface, surface, effluent diffuser, diffusion well, etc.)
Average change in temperature (delta T)	Maximum change in temperature (delta T)	Maximum temperature	hours per day	days per year	From	To	MGD	

9. Are any water treament chemicals or additives that are used by your facility subsequently discharged through this outfall?

[ ] YES - Complete the following table and complete pages 1 of 3 and 2 of 3 of Form WTCFX for each water treatment chemical listed.

[X] NO - Go to Item 10. below.

Manufacturer	WTC trade name	Manufacturer	WTC trade name

10. Has any biological test for acute or chronic toxicity been performed on this outfall or on the receiving water in relation to this outfall in the past three (3) years?

[ ] YES - Complete the following table.

[X] NO - Go to Item 11. on the following page.

Water tested	Purpose of test	Type of test	Chronic or Acute?	Subject species	Testing date(s)		Submitted? (Date)
					Start	Finish	

INDUSTRIAL APPLICATION FORM NY-2C
Section II - Outfall Information

Facility Name:	Outfall No.:
OU-1 Treatment Facility	002
	SPDES Number:

11. Is the discharge from this outfall treated to remove process wastes, water treatment additives, or other pollutants?

[X] YES - Complete the following table. Treatment codes are listed in Table 4.

[ ] NO - Go to Item 12 below.

Treatment process	Treatment Code(s)	Treatment used for the removal of:	Design Flow Rate (include units)
Recovered groundwater is treated by two (2) Air Stripping Towers in Series.	1-Y	Chlorinated Solvent	730 gpm

12. Does this facility have either a compliance agreement with a regulating agency, or have planned changes in production, which will materially alter the quantity and/or quality of the discharge from this outfall?

[X] YES - Complete the following table.

[ ] NO - Go to Section III on the following page.

Description of project	Subject to Condition or Agreement in existing permit or consent order? (List)	Change due to production increase?	Completion Date(s)	
			Required	Projected
Groundwater remediation per NYSDEC Consent Order	Consent Order # WI-0787-96-12			9/00

This completes Section II of the SPDES Industrial Application Form NY-2C. Section I, which requires general information regarding your facility, and Section III, which requires sampling information for each of the outfalls at your facility, must also be completed and submitted with this application.

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name:	SPDES No.:	Outfall No.:
OU-1 Treatment Facility		002

1. Sampling Information - Conventional Parameters

Provide the analytical results of at least one analysis for every pollutant in this table. If this outfall is subject to a waiver as listed in Table 5 of the instructions for one or more of the parameters listed below, provide the results for those parameters which are required for this type of outfall.

	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
	Value .43 MG		Value 13 MG		Value 383 MG		N/A			Value		
	Value N/A		Value N/A		Value N/A		N/A			Value		
	Value N/A		Value N/A		Value N/A		N/A			Value		
	Minimum N/A	Maximum N/A	Minimum N/A	Maximum N/A			N/A			Minimum	Maximum	

2. Sampling Information - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

a. Primary Industries: I. Does the discharge from this outfall contain process wastewater?

- [ ] **Yes** - Go to Item II. below.
- [X] **No** - Go to Item b. below.

II. Indicate which GC/MS fractions have been tested for: Volatiles: [ ] Acid: [ ] Base/Neutral: [ ] Pesticide: [ ]

b. All applicants: I. Do you know or have reason to believe that any of the pollutants listed in Tables 6, 7, or 8 of the instructions are present in the discharge from this outfall?

- [X] **Yes** - Concentration and mass data attached.
- [ ] **No** - Go to Item II. below.

II. Do you know or have reason to believe that any of the pollutants listed in Table 9 or Table 10 of the instructions, or any other toxic, harmful, or injurious chemical substances not listed in Tables 6-10, are present in the discharge from this outfall?

- [ ] **Yes** - Source or reason for presence in discharge attached
- [ ] **Yes** - Quantitative or qualitative data attached
- [ ] **No**

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name:	SPDES No.:	Outfall No.:
OU-1 Treatment Facility		002

3. Projected Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results of at least one analysis for each pollutant that you know or have reason to believe is present in this discharge, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a on the preceding page.

												Usage of oxic able	
Cis-1,2 Dichloroethylene CAS Number: 00156-59-2	<5	NA	<5	NA	ug/L	NA							
Vinyl Chloride CAS Number: 00075-01-4	<2	NA	<2	NA	ug/L	NA							
Tetrachloroethylene CAS Number: 00127-18-4	<5	NA	<5	NA	ug/L	NA							
Trichloroethylene CAS Number: 00079-01-6	<5	NA	<5	NA	ug/L	NA							
Vinylidine Chloride CAS Number: 00075-35-4	<5	NA	<5	NA	ug/L	NA							
Freon 113 CAS Number: 00076-13-1	<5	NA	<5	NA	ug/L	NA							
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: OU-1 Treatment Facility	SPDES No.:	Outfall No.: 002

4. Existing Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results for the last three (3) years for each pollutant that you know or have reason to believe present in this discharge from this outfall, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a for this discharge.

[illegible]		Parameter name:	Parameter name:	Parameter name:	Parameter name:	Parameter name:	Parameter name:	Parameter name:
Page Of		CAS Number:	CAS Number:	CAS Number:	CAS Number:	CAS Number:	CAS Number:	CAS Number:
Date	Concentration	Concentration	Concentration	Concentration	Concentration	Concentration	Concentration	Concentration
	Units:	Units:	Units:	Units:	Units:	Units:	Units:	Units:
None Availabile - New Facility								

State Pollutant Discharge Elimination System (SPDES)

INDUSTRIAL APPLICATION FORM NY-2C

For New Permits and Permit Modifications to Discharge Industrial Wastewater and Storm Water

Section II - Outfall Information

Please type or print the requested information.

Facility Name:	SPDES Number:
OU-1 Treatment Facility	

1. Outfall Number and Location

Outfall No.:		
003		
Latitude ° ' "	Longitude ° ' "	Receiving Water
		Groundwater

2. Type of Discharge and Discharge Rate (List all information applicable to this outfall)

	Volume/Flow	Units MGD	Units GPM	Units Other (specify)		Volume/Flow	Units MGD	Units GPM	Units Other (specify)
a. Process Wastewater					f. Noncontact Cooling Water				
b. Process Wastewater					g. Remediation System Discharge	243		X	
c. Process Wastewater					h. Boiler Blowdown				
d. Process Wastewater					i. Storm Water				
e. Contact Cooling Water					j. Sanitary Wastewater				
k. Other discharge (specify):									
l. Other discharge (specify):									

3. List process information for the Process Wastewater streams identified in 2.a-d above:

a. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
b. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
c. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure
d. Name of the process contributing to the discharge			Process SIC code:
Describe the contributing process	Category / Subcategory	Quantity per day	Units of measure

4. Expected or Proposed Discharge Flow Rates for this outfall:

a. Total Annual Discharge	b. Daily Minimum Flow	c. Daily Average Flow	d. Daily Maximum Flow	e. Maximum Design flow rate
128 MG	0.24 MGD	0.35 MGD	0.43 MGD	0.43 MGD

INDUSTRIAL APPLICATION FORM NY-2C
Section II - Outfall Information

Facility Name: OU-1 Treatment Facility	Outfall No.: 003
	SPDES Number:

5. Is this a seasonal discharge?

[ ] YES - Complete the following table.

[X] NO - Go to Item 6 below.

Operations contributing flow (list)	Discharge frequency		Flow				
	Batches per year	Duration per batch	Flow rate per day		Total volume per discharge	Units	Duration (Days)
			LTA	Daily Max			

6. Water Supply Source (Indicate all that apply)

	Name or owner of water supply source	Volume or flow rate	Units (check one)		
Municipal Supply			MGD	GPD	GPM
Private Surface Water Source			MGD	GPD	GPM
Private Supply Well	Lockheed Martin Corporation	730	MGD	GPD	X GPM
Other (specify)			MGD	GPD	GPM

7. Outfall configuration: (Surface water discharges only)

A. Where is the discharge point located with respect to the receiving water?

In the streambank: [ ]

In the stream: [ ]

Within a lake or ponded water: [ ]

Within an estuary: [ ] Attach Supplement C, MIXING ZONE REQUIREMENTS FOR DISCHARGES TO ESTUARIES.

Discharge is equipped with diffuser: [ ] Attach description, including configuration and plan drawing of diffuser, if used.

B. If located in a stream, approximately what percentage of stream width from shore is the discharge point located?

10% [ ] 25% [ ] 50% [ ] Other: [ ]

C. If located in a stream, describe the stream geometry in the general vicinity of the discharge point, under low flow conditions:

Stream width	Stream depth	Stream velocity
Feet	Feet	Feet/Sec

Are the results of a mixing/diffusion study attached? [ ] YES [ ] NO

INDUSTRIAL APPLICATION FORM NY-2C
Section II - Outfall Information

Facility Name:	Outfall No.:
OU-1 Treatment Facility	003
	SPDES Number:

8. Thermal Discharge Criteria

Is your facility one of the applicable types of facilities listed in the instructions, and does the temperature of this discharge exceed the receiving water temperature by greater than three (3) degrees Fahrenheit?

[ ] YES - Complete the following table. [ ] Information on the intake and discharge configuration of this outfall is attached.

[X] NO - Go to item 9. below.

Discharge Temperature, deg. F			Duration of maximum discharge temperature		Dates of maximum discharge temperature		Maximum flow rate	Discharge configuration (e.g. subsurface, surface, effluent diffuser, diffusion well, etc.)
Average change in temperature (delta T)	Maximum change in temperature (delta T)	Maximum temperature	hours per day	days per year	From	To	MGD	

9. Are any water treament chemicals or additives that are used by your facility subsequently discharged through this outfall?

[ ] YES - Complete the following table and complete pages 1 of 3 and 2 of 3 of Form WTCFX for each water treatment chemical listed.

[X] NO - Go to item 10. below.

Manufacturer	WTC trade name	Manufacturer	WTC trade name

10. Has any biological test for acute or chronic toxicity been performed on this outfall or on the receiving water in relation to this outfall in the past three (3) years?

[ ] YES - Complete the following table.

[X] NO - Go to Item 11. on the following page.

Water tested	Purpose of test	Type of test	Chronic or Acute?	Subject species	Testing date(s)		Submitted? (Date)
					Start	Finish	

INDUSTRIAL APPLICATION FORM NY-2C
Section II - Outfall Information

Facility Name:	Outfall No.:
OU-1 Treatment Facility	003
	SPDES Number:

11. Is the discharge from this outfall treated to remove process wastes, water treatment additives, or other pollutants?

[X] YES - Complete the following table. Treatment codes are listed in Table 4.

[ ] NO - Go to Item 12 below.

Treatment process	Treatment Code(s)	Treatment used for the removal of:	Design Flow Rate (include units)
Recovered groundwater is treated by two (2) Air Stripping Towers in Series.	1-Y	Chlorinated Solvent	730 gpm

12. Does this facility have either a compliance agreement with a regulating agency, or have planned changes in production, which will materially alter the quantity and/or quality of the discharge from this outfall?

[X] YES - Complete the following table.

[ ] NO - Go to Section III on the following page.

Description of project	Subject to Condition or Agreement in existing permit or consent order? (List)	Change due to production increase?	Completion Date(s)	
			Required	Projected
Groundwater remediation per NYSDEC Consent Order	Consent Order # WI-0787-96-12			9/00

This completes Section II of the SPDES Industrial Application Form NY-2C. Section I, which requires general information regarding your facility, and Section III, which requires sampling information for each of the outfalls at your facility, must also be completed and submitted with this application.

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name:	SPDES No.:	Outfall No.:
OU-1 Treatment Facility		003

1. Sampling Information - Conventional Parameters

Provide the analytical results of at least one analysis for every pollutant in this table. If this outfall is subject to a waiver as listed in Table 5 of the instructions for one or more of the parameters listed below, provide the results for those parameters which are required for this type of outfall.

PLEASE PRINT IN THE SPACES PROVIDED												
Pollutant												
a. Biochemical Oxygen Demand 5 day (BOD5)	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
b. Chemical Oxygen Demand (COD)	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
c. Total Suspended Solids (TSS)	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
d. Total Dissolved Solids (TDS)	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
e. Oil & Grease	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
f. Chlorine, Total Residual (TRC)	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
g. Total Organic Nitrogen (TON)	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
h. Ammonia (as N)	N/A	N/A	N/A	N/A	N/A	N/A	N/A					
i. Flow	Value .43 MG		Value 13 MG		Value 383 MG		N/A			Value		
j. Temperature (Winter)	Value N/A		Value N/A		Value N/A		N/A			Value		
k. Temperature (Summer)	Value N/A		Value N/A		Value N/A		N/A			Value		
l. pH	Minimum N/A	Maximum N/A	Minimum N/A	Maximum N/A			N/A			Minimum	Maximum	

2. Sampling Information - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

a. Primary Industries: i. Does the discharge from this outfall contain process wastewater?

[ ] **Yes** - Go to Item II. below.
[X] **No** - Go to Item b. below.

ii. Indicate which GC/MS fractions have been tested for: Volatiles: [ ] Acid: [ ] Base/Neutral: [ ] Pesticide: [ ]

b. All applicants: i. Do you know or have reason to believe that any of the pollutants listed in Tables 6, 7, or 8 of the instructions are present in the discharge from this outfall?

[X] **Yes** - Concentration and mass data attached.
[ ] **No** - Go to Item ii. below.

ii. Do you know or have reason to believe that any of the pollutants listed in Table 9 or Table 10 of the instructions, or any other toxic, harmful, or injurious chemical substances not listed in Tables 6-10, are present in the discharge from this outfall?

[ ] **Yes** - Source or reason for presence in discharge attached
[ ] **Yes** - Quantitative or qualitative data attached
[ ] **No**

INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: OU-1 Treatment Facility	SPDES No.:	Outfall No.: 003

3. Projected Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results of at least one analysis for each pollutant that you know or have reason to believe is present in this discharge, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a on the preceding page.

[illegible] Page of

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cis-1,2 Dichloroethylene CAS Number: 00156-59-2	<5	NA	<5	NA	ug/L	NA							
Vinyl Chloride CAS Number: 00075-01-4	<2	NA	<2	NA	ug/L	NA							
Tetrachloroethylene CAS Number: 00127-18-4	<5	NA	<5	NA	ug/L	NA							
Trichloroethylene CAS Number: 00079-01-6	<5	NA	<5	NA	ug/L	NA							
Vinylidine Chloride CAS Number: 00075-35-4	<5	NA	<5	NA	ug/L	NA							
Freon 113 CAS Number: 00076-13-1	<5	NA	<5	NA	ug/L	NA							
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													
CAS Number:													

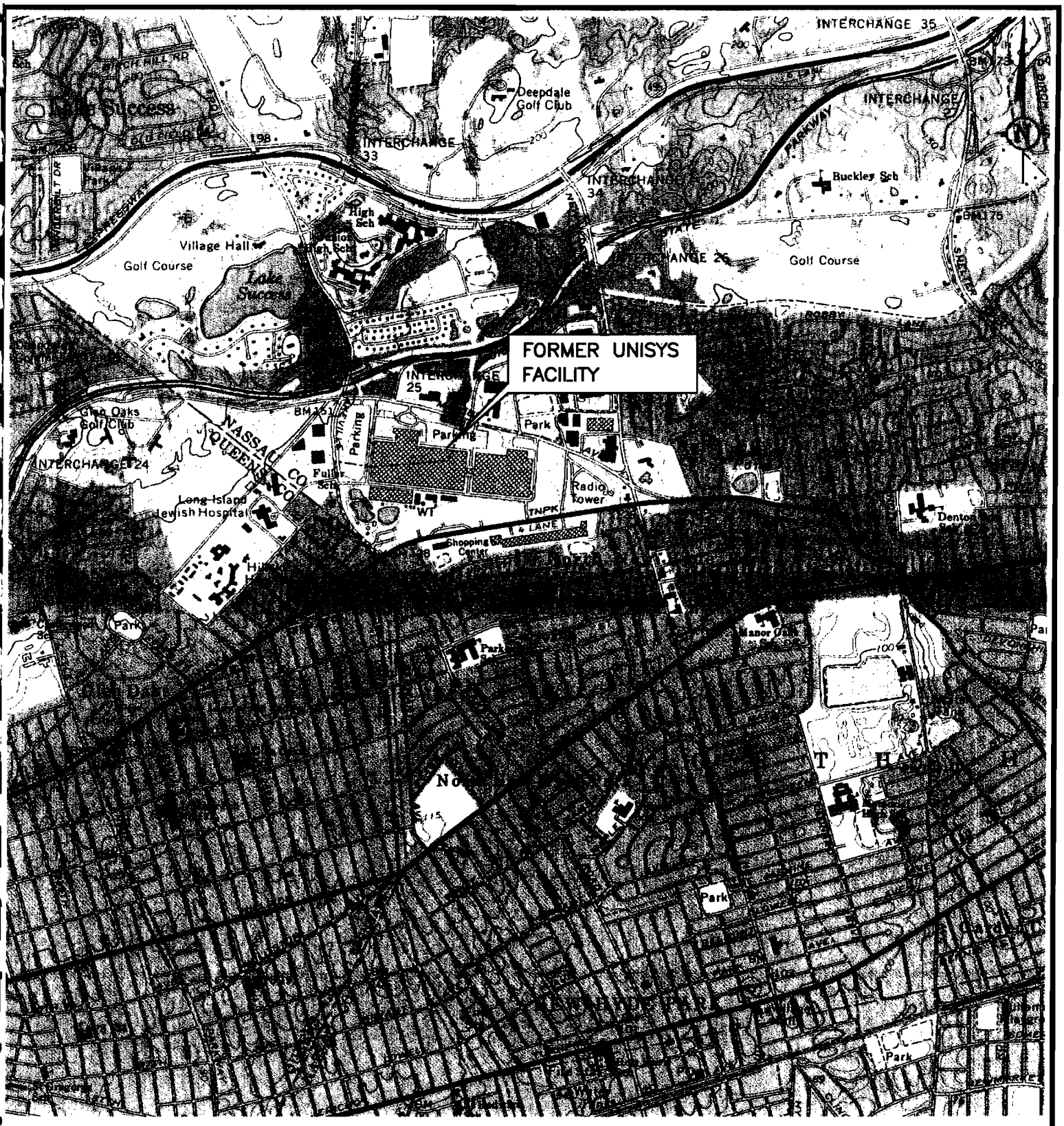
INDUSTRIAL APPLICATION FORM NY-2C
Section III - Sampling Information

Facility Name: OU-1 Treatment Facility	SPDES No.:	Outfall No.: 003

4. Existing Effluent Quality - Priority Pollutants, Toxic Pollutants, and Hazardous Substances

Provide analytical results for the last three (3) years for each pollutant that you know or have reason to believe present in this discharge from this outfall, as well as for any GC/MS fractions and metals required to be sampled from Section III Forms, Item 2.a for this discharge.

Make as many copies of this table as necessary for each outfall. You can list the results from 24 sampling dates on each copy of this page.		Parameter name:	Parameter name:	Parameter name:	Parameter name:	Parameter name:	Parameter name:	Parameter name:
Page Of		CAS Number:	CAS Number:	CAS Number:	CAS Number:	CAS Number:	CAS Number:	CAS Number:
Date	Flow rate	Concentration	Concentration	Concentration	Concentration	Concentration	Concentration	Concentration
	Units:	Units:	Units:	Units:	Units:	Units:	Units:	Units:
None Availabile - New Facility								



SOURCE:
U.S.G.S. 7.5 MINUTE QUADRANGLE, LYNBROOK, N.Y. AND SEA CLIFF, N.Y., REVISED 1979.

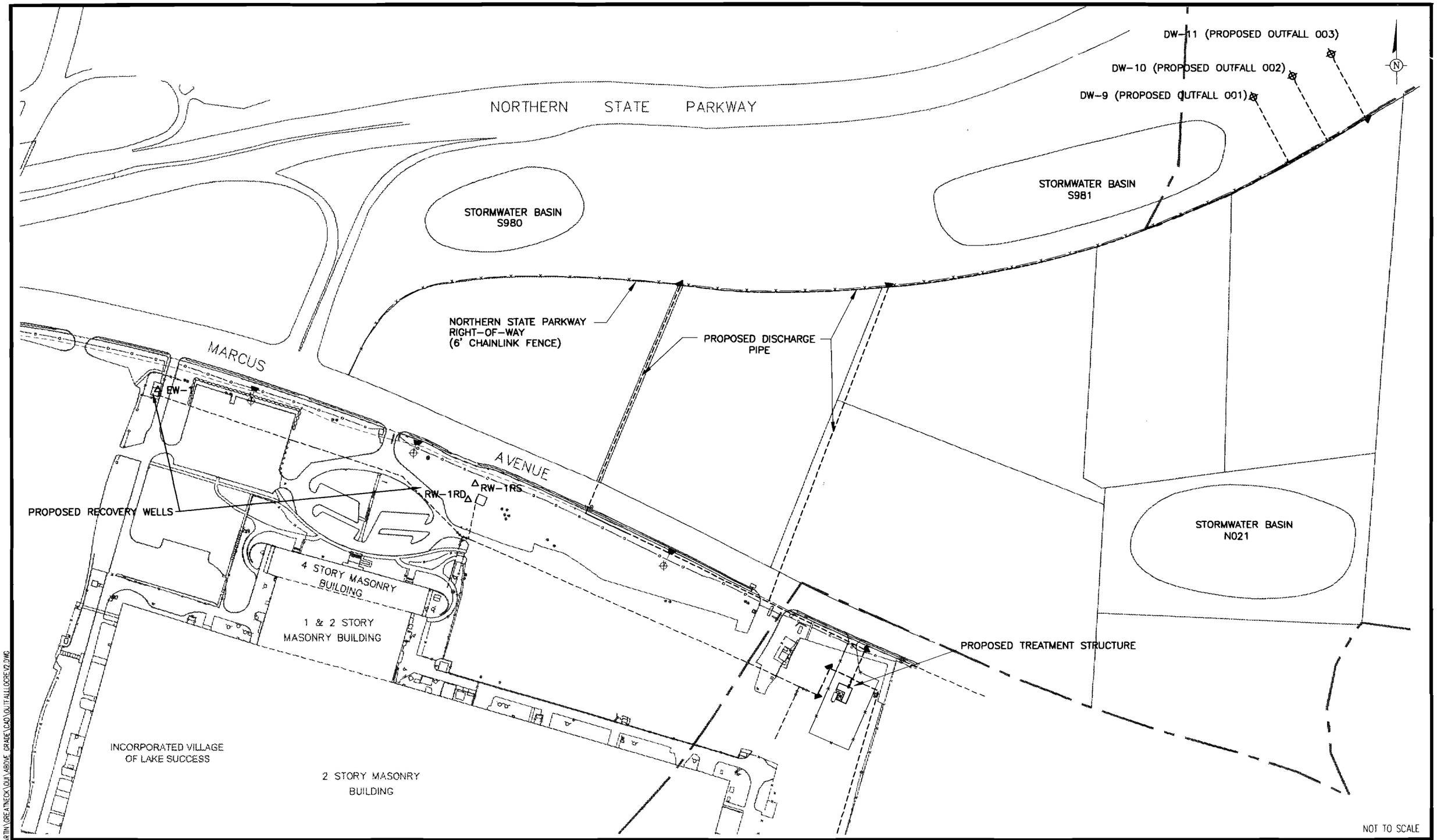
SCALE: 1"=2000'-0"

NO.	DATE	REVISION DESCRIPTION	BY / CKD

CLIENT:
LOCKHEED MARTIN CORPORATION

ARCADIS
GERAGHTY & MILLER

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
A.G.	11/4/99	C. SAN GIOVANNI 10/99	
		LEAD DESIGN PROF.	CHECKED N. BENOWITZ 10/99
SITE LOCATION MAP		PROJECT NUMBER	DRAWING NUMBER
OU-1 TREATMENT FACILITY GREAT NECK, NEW YORK		NY001227.0005	1



NOT TO SCALE

C:\APROJECT\LOCKHEED MARTIN\GREATNECK\OU1\ABOVE_GRADE\CAD\OUTFALLLOCREV2.DWG

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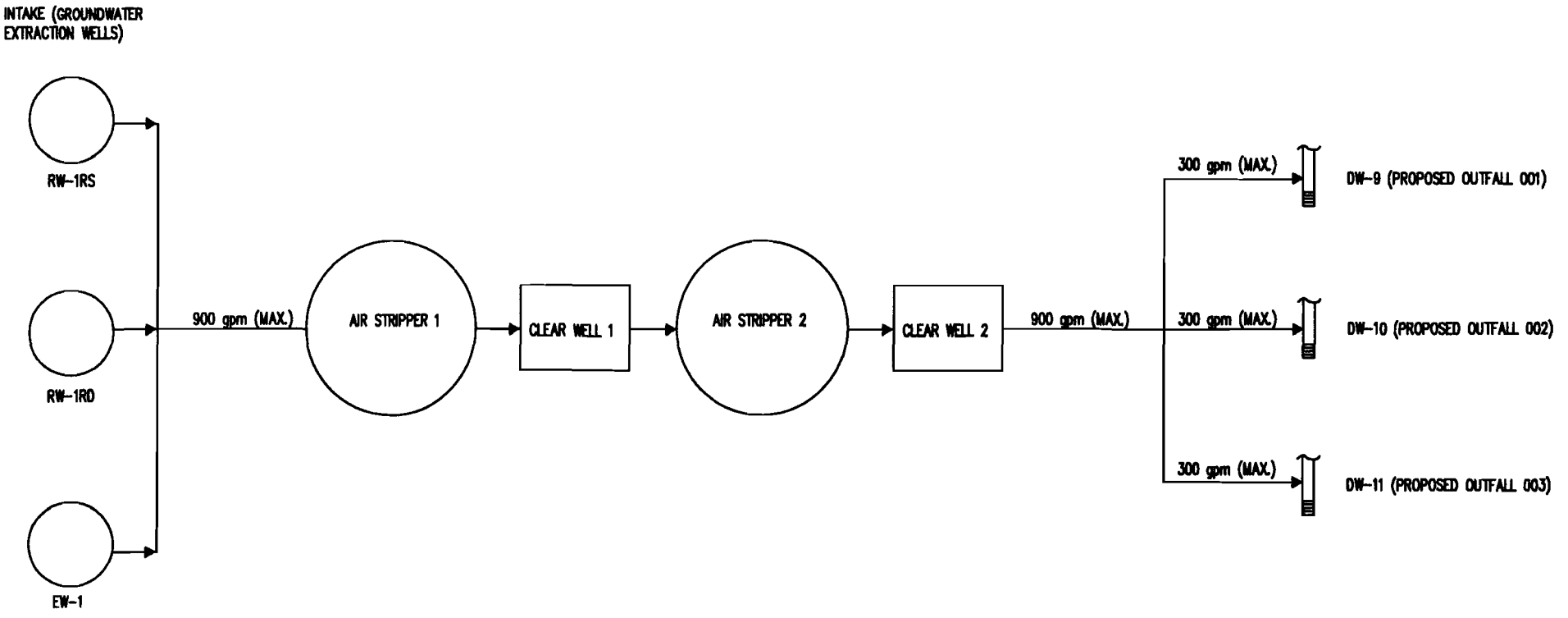
NO.	DATE	REVISION DESCRIPTION	BY
1	3/24/00	ISSUED TO NYSDEC	MS / GN / CKD

ARCADIS GERAGHTY & MILLER
88 Duryea Road
Melville, New York 11747
Tel: 516/249-7600 Fax: 516/249-7610

OU-1 TREATMENT FACILITY
GREAT NECK, NEW YORK

OUTFALL LOCATIONS SPDES DISCHARGE PERMIT

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
A.G.	11/5/99	C. SAN GIOVANNI	T. LOBASSO
		LEAD DESIGN PROF. G. NETUSCHIL	CHECKED M. SOLIMAN
		PROJECT NUMBER NY001227.007	DRAWING NUMBER 2



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NO.	DATE	REVISION DESCRIPTION	BY
1	3/24/00	ISSUED TO NYSDEC	MS / GN

ARCADIS GERAGHTY & MILLER

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
A.G.	11/5/99	C. SAN GIOVANNI	T. LOBASSO
		LEAD DESIGN PROF. G. NETUSCHIL	CHECKED M. SOLIMAN
		PROJECT NUMBER	DRAWING NUMBER

WATER FLOW DIAGRAM
SPDES DISCHARGE PERMIT
OU-1 TREATMENT FACILITY
GREAT NECK, NEW JERSEY

NY001227.07

3

C:\PROJECT\LOCKHEED MARTIN\GREATNECK\OU1\ABOVE GRADE\CAD\FLOW DIAGRAM.DWG