U.S. Army Corps of Engineer

F U S R A P

Niagara Falls Storage Site FUSRAP Site
Lewiston, New York

Final - Work Plan Addendum for the RI Investigative Derived Waste (IDW) Water Sampling and Disposal

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U.S. Army Corps of Engineers
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STATEMENT OF INDEPENDENT TECHNICAL REVIEW

SAIC has completed the **Quality Control Plan Addendum** and the **Work Plan Addendum,** including the **Health, Safety, and Radiation Protection Plan Addendum,** for the **RI Investigative Derived Waste (IDW) Water Sampling and Disposal at the Niagara Falls Storage Site.**

Notice is hereby given that an ITR has been conducted on the above documents and is appropriate to the level of risk and complexity inherent in the project. During the ITR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of assumptions; methods, procedures, and material used in analyses; alternatives evaluated; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing Corps policy.

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INTRODUCTION

This is an Addendum to the September 1999 Final Draft Field Sampling Plan for the Remedial Investigations (RI) at the Niagara Falls Storage Site (NFSS) prepared by Maxim Technologies, Inc (MAXIM, 1999). The 1999 MAXIM Field Sampling Plan and two Addenda to the Sampling Plan prepared in 2001 (MAXIM, 2001) and 2002 (MAXIM, 2002) were used by Science Applications International Corporation (SAIC) as the basis for preparing this Addendum which addresses the RI Investigative Derived Waste (IDW) Water Sampling and Disposal task (the IDW task) to be conducted by SAIC. The IDW task is being conducted under a separate HTRW Architect-Engineer (A-E) services contract. This Work Plan Addendum describes activities to be performed by SAIC during the sampling and disposal of IDW liquid generated between March 2003 and October 2003 during the RI tasks. The liquid IDW is currently stored in eight temporary storage tanks at the site (Table 1.1).

1.0 PROJECT DESCRIPTION

The primary objective of this revision to the Work Plan and the 2001 and 2002 Work Plan Addenda is to address the efforts necessary to perform liquid and solid IDW sampling as a bench test to demonstrate to the New York State Department of Environmental Conservation (NYSDEC) and the wastewater treatment facility that filtering liquid IDW with a 10-micron filter will remove suspended radioactive materials sufficiently to meet 6 NYCRR Part 380 discharge requirements and to characterize the solid waste stream for solid disposal. To accomplish this objective, SAIC will perform two different field efforts. The first field effort will entail removing the vegetation growing in the storage tanks, sampling the solid and liquid IDW present in all eight tanks, and preparing at least one tank for the second field effort. The second field effort will involve the filtering and disposal of liquid IDW, containerizing the solid IDW for disposal, and preparing the associated vegetation present in some of the tanks for disposal.

During the first field effort, one representative solid sample will be collected from each tank, prior to agitation, and analyzed for radiological as well as solid waste disposal parameters (see Table 2.1). If sufficient solid material is not available to meet sample volume requirements, this step will be by-passed and solids will be collected from the filters. During this task, SAIC will mechanically remove and drum approximately 100 gallons of solids from Tank 7. After the solids have been removed, Tank 7 will be purged using liquid IDW from Tank 6 and then rinsed at least 3 times with potable water from an onsite water supply. The preferred source of potable water shall be Building 429, which is located near the IDW tanks. Alternately, a fire hydrant is located a further distance from the tanks and could also be used. The resulting rinsewater will be consolidated back into liquid IDW Tank 6 prior to the collection of 10-micron effluent sample from that tank. That is, a separate sample of rinse water from Tank 7 will not be collected. Decontaminating this tank during the bench scale test allows the rinsewater to be mixed with the other IDW and to then be tested for liquid disposal parameters. It also prepares the tank to be used as storage for some of the bulk filtered effluent generated in the second field effort. After collecting the solid samples, each tank, except Tank 7 which will be empty, will then be agitated to the extent possible and the volumes of liquid necessary for analytical procedures will be withdrawn. The water samples will be passed through a 10-micron filter in the field before being sent to the laboratory for analyses. An unfiltered water sample from Tank 4 will also be obtained and sent to the laboratory because its contents were not originally included in the discharge request. All liquid and solid IDW samples will be sent to General Engineering Laboratories (GEL), a U.S. Army Corps of Engineers (USACE) approved laboratory. All expended filters associated with the sampling will be placed in lined 55-gallon drums and retained on site for future disposal. The contents of all other tanks, except Tank 6 and Tank 7, will not be combined during the first field effort.

Upon receipt of sampling results, data will be verified and the results will be submitted to USACE and NYSDEC. In addition, SAIC will research additional disposal facilities in the vicinity of NFSS and tabulate information on each facility's waste acceptance criteria for submittal to USACE. Once concurrence is reached on an appropriate wastewater disposal facility, SAIC will coordinate with the disposal facility and will submit an amended disposal application. Upon approval from NYSDEC, the wastewater treatment facility, and notification from USACE to proceed, the second field effort will take place. SAIC will remobilize to filter and dispose of the IDW liquid and containerize all associated solid IDW and vegetation for disposal. All bulk sediments collected from the IDW tanks, expended filters, and dried vegetation will be consolidated in lined 55-gallon drums and retained on site for future disposal at Waste Control Specialists (WCS) in Andrews, Texas. After all IDW has been removed, the tanks will be triple rinsed with potable water from Building 429 or the fire hydrant. The rinse water and filtered IDW liquids will be sent to an as yet undetermined wastewater treatment facility for disposal. Table 1.1 shows the initial volume and origin of the contents of the IDW tanks.

Table 1.1 Liquid IDW Tanks, Origins, and Volumes

Tank Number	Origin of Liquid IDW	Volume of Liquid IDW	Additional Comments
1	NFSS Purge and Decontamination Water	900 gallons	Originally listed as containing 580 gallons in the disposal application
2	NFSS Purge, Decontamination, and Well Development Water	1350 gallons	-
3	Vicinity Property G (VPG) Decontamination Water	550 gallons	-
4	NFSS Environmental Surveillance Purge Water	100 gallons	Not originally included in discharge request
5	NFSS Decontamination Water	1500 gallons	-
6	NFSS Decontamination Water	500 gallons	-
7	-	100 gallons (of sediment)	Not originally included in discharge request
8	Modern Landfill Purge Water	150 gallons	-

2.0 FIRST FIELD EFFORT

During this field effort, SAIC will sample both the solid and liquid IDW present on site in accordance with the Scope of Work set fourth by the USACE.

2.1 FIELD METHODS AND SAMPLE COLLECTION PROCEDURES

2.1.1 Vegetation Removal

Vegetation normally associated with wet soils has grown in nearly all of the IDW tanks. This vegetation will be removed during the first field effort through the use of a metal rake, pitch fork, or similar tool after the initial sediment samples are collected (Section 2.1.2) and prior to agitating or suspending the solids in the tanks. The vegetation removal will be attempted through the existing opening in the tank. It may be necessary to cut an additional access hole in the top of the tanks. If cutting a hole is necessary, an adjustable expanding plug, such as a Plastic Gripper® Plug or similar, will be used to plug the hole after the work is complete.

Efforts will be made to remove the sediment from the roots to a feasible extent by tapping the roots against the tank walls, rinsing the roots with water in the tanks or from a portable water sprayer, or similar method.

The vegetation will be laid out on plastic sheeting or aluminum foil in a weather protected area identified by USACE to remove excess water on and in the plants. The plastic sheeting may have a thin layer of an absorbent material, such as dried clay, Oil Dry® or DriMop®, applied to the surface to accelerate the drying time. The vegetation may also have a thin layer of absorbent material placed on top of it to further accelerate the drying time. The vegetation will remain staged on the plastic sheeting in a weather protected area until the second field effort occurs.

2.1.2 Solid Sample Collection

It will be necessary to collect a total of eight (8) sediment soil samples, one from each tank, which will be comprised of five (5) aliquot samples from each tank. Sample composition procedures will follow the field technical procedures in Maxim's approved Work Plan(s). Prior to vegetation removal activities the five (5) aliquot sediment samples will be collected from each tank and mixed in a stainless steel bowl, or similar, for each IDW tank composite sample. The sample will be analyzed for the parameters listed in Table 2.2. The sediment samples will be collected using appropriate sampling equipment that will allow collection of a good cross section of the sediment such as a drum thief, bucket auger, and acetate tube. Other equipment that may be utilized depending on the quantity of vegetation and the depth of sediment and water in each tank include a ponar dredge sampler, stainless steel spoon or trowel attached to an extension rod, or other similar sample method. Efforts will be made to collect equal quantities for the composite sample during collection. If the sediment volume in a tank is insufficient to collect a sample, sediments that collect in the 10-micron filter will be analyzed according to the priority list detailed in Table 2.2. Sample collection equipment, including stainless steel bowls, will be decontaminated (Section 2.4) prior to use and between sample collection in each tank. The decontamination water generated during the collection of solid samples will be returned to its associated IDW tank. The following details the use of the sampling equipment.

The *drum thief* is a sampling device which has a hollow tube attached to a tee-handle and is generally used to collect soil samples from drums. The sampler will be pressed into the sediment and if necessary, twisted to sheer off the leading edge of the sample. The collected sample will then be placed into the stainless steel bowl for composite. This device is useful when sediment consistency and vegetation are relatively dense.

The *bucket hand auger* consists of an open top cylinder with offset cutting flights and is attached to a tee-handle. Much like the drum thief, the hand auger is pressed or twisted into the sediment and placed in the stainless steel bowl. The bucket hand auger is useful when sediment consistency and vegetation are relatively dense.

The *acetate tube* is a hollow plastic tube that is inserted into the sediment and plugged at the opposite end trapping sediment. The sediment can then be scooped out of the end of the tube and into the stainless steel bowl. The plug can be fitted with a compression fitting which would allow a peristaltic pump to remove the water above the sediment in the event the sediment can not be scooped out without the water above it entering the stainless steel bowl.

The *ponar dredge sampler*, attached to a rope, has butterfly valves on its top surface to permit water to pass through as the open sampler descends to the sediment layer. The sampler will be lowered into opening of the tank and into the sediment layer of the tank. Once in a desired location in the tank, the ponar sampler will be triggered or pulled closed trapping the sediment and closing the butterfly valves

which minimize water movement and flow through as the sampler is pulled to the surface. The sampler will then be removed from the tank, opened, and the sediments placed in a stainless steel bowl. This sampler is less effective when plant material is dense.

The *stainless steel spoon or trowel attached to an extension rod* entails attaching a spoon or trowel to an extension rod or stick with nylon cable ties or similar. The spoon or trowel is then used to scoop the sediment out of the tank and into a stainless steel bowl. This is useful when water levels are relatively close to the sediment layer and when vegetation is moderately dense.

Samples will be packaged following approved Work Plan procedures. Sample numbers will be recorded on the chain-of-custody. Field logbooks will follow Maxim's approved Work Plan(s).

Quality Control (QC) samples will not be collected for this task since the contract lab (GEL) has been used for RI sampling conducted from 1999 to the present, and sufficient quality control has been established from previous RI quality control sampling.

2.1.3 Emptying and Cleaning of Tank 7

In order to test rinse water for liquid disposal parameters, Tank 7 will be emptied and cleaned during the bench scale sampling. Efforts will be made to decant wastewater from Tank 7 into Tank 6 prior to removal of the sediments in Tank 7. Appropriate methods for wastewater removal will be determined in the field. The sediment will be removed by laying the tank on its sidewall and shoveling the sediment material out of the tank and into lined 55-gallon drums. Based on conversations with USACE, a skid steer loader and operator will be available to lift or move the tanks as needed. Part of the tank containment area will be dismantled in order to access Tank 7. The tank will be tilted on its side using a skid steer loader, sand bags and wood blocks. Filled sand bags or other cushioning material should be used to "catch" the tank when it is tilted onto its sidewall to prevent damage to the tank. The tank should not be tilted with the opening on the bottom until most of the sediment and water have been removed. Once the tank is placed on its sidewall, sand bags or wood blocking will be used to stabilize the tank and to prevent the tank from rolling during the sediment removal process. Sediment that is out of reach of the shovel may be pulled closer to the tank opening using a garden hoe or similar tool with an extension handle. An attempt will be made to keep a tarp under the tank during this process so if any wet solids are spilled they will be captured on the tarp. Once the solids are in the drums, portland cement, dried clay (oil absorbent), Oil Dry® or DriMop® may be added to absorb excess water in the sediment. The skid steer loader will be used to reset Tank 7 back to its original position. Water from Tank 6 will be used to flush the remaining sediment from the walls and floor of Tank 7. A submersible pump will be suspended in Tank 6 water above the sediment to avoid pumping the sediment to Tank 7 while it is being rinsed. A second submersible pump will then be placed in Tank 7 to pump the liquid and suspended solids into Tank 6. A high-pressure washer, using potable water from Building 429 or the fire hydrant, will be used to triple rinse Tank 7 to remove all visible contaminants. While rinsing the tank, a small submersible pump with the capability of removing water to within 1/8" of the tank floor, will be used to pump the rinse water into Tank 6. During the cleaning process, the tank will be tilted to facilitate removal of as much water as possible with the pump. Small amounts of rinse water, 5 gallons or less may remain in the tank. Tank 7 will then be used as the first collection tank for 10-micron filtered water in the bench scale filtration test and the full scale filtration effort.

2.1.4 Agitation and Liquid Sampling

After sediment samples have been collected, the vegetation has been removed, and Tank 7 has been cleaned, agitation of the sediment and water in the remaining seven tanks will commence as the first step in collecting representative water samples. The tanks will be sampled in the following order: Tank 4, Tank 1, Tank 2, Tank 5, Tank 6, Tank 8, and Tank 3. A minimum of two 2" submersible pumps will be required for this phase of work. An additional 3/4" submersible pump with the capability of removing the water to within 1/8" of the tank floor will be needed for final dewatering and pressure washing of Tank 7. All pumps, nozzles, and hoses used for this work will be supplied by USACE onsite. The contents of each tank should be agitated until the sediment material in the tank is in suspension. Mixing will be accomplished by placing a submersible pump with a short section of discharge hose connected to the pump discharge port in each tank and operating the pump for a period of time. Field observation will be used to determine the optimum mixing method using the submersible pump. A metal rod or wood board may be used to guide the discharge hose along the bottom of the tank to maximize mixing the tank contents. During mixing of the tank contents, any remaining vegetative material may be removed using a pool skimmer screen.

After the tank contents are mixed a dedicated 10-micron absolute-rated micro-fiber filter bag will be attached to the pump discharge hose. The filter bag will be similar to the filter bags to be used during the second field effort and are shown in the Attachments, McMaster-Carr catalog page 329. Filtered water effluent from the filter bag will then be directed into a sample collection container. The filter bag will be removed from the hose and retained for use during the bench scale filtration test.

The submersible pump and discharge hose will be decontaminated between tanks and after the final tank using two (2) 55-gallon drums partially filled with water. After mixing the contents of an IDW tank the submersible pump will be removed from that tank and placed into the first drum containing 35 to 40 gallons of potable water from Building 429 or the fire hydrant. The submersible pump/discharge hose assembly will be operated to flush the sediment from the pump/hose assembly. The submersible pump/discharge hose assembly will then be removed from the first drum and placed into the second drum containing 35-40 gallons of deionized (DI) water. The pump will be operated to circulate water in the drum to rinse the pump/hose assembly. After each tank is sampled and the pump is rinsed a visual inspection of the potable rinsewater in the first decontamination drum will be made. If the water appears turbid from an abundance of sediments being flushed out of the pump/hose, a new 55 gallon drum containing potable water will be used. In addition, the drum containing the deionized water will be visually inspected after each rinse cycle. This drum may also need to be changed, however if the first drum is changed occasionally, the second drum may never require replacement. After all of the tanks have been sampled, the decontamination water in all drums will be pumped through a 10-micron filter bag into Tank 7.

In addition to the field-filtered samples discussed above, unfiltered samples will be collected from Tank 4 and analyzed for the parameters found in Table 2.1. The wastewater in Tank 4 will be agitated to resuspend sediment prior to collection of unfiltered samples. Unfiltered samples will then be collected by dipping a sample container into the water or by the use of a peristaltic pump with dedicated tubing.

QC samples will not be collected for this task since the contract lab (GEL) has been used for RI sampling conducted from 1999 to the present, and sufficient quality control has been established from previous RI quality control sampling.

2.2 BENCH SCALE FILTRATION TEST

A bench scale filtration test will be completed to test filtration techniques and equipment selection for the IDW filtering that will occur during the second field effort. The objective of this bench scale test will be to verify that USACE submersible pumps will provide sufficient head to filter IDW sediment into a 10-micron filter bag, and to do it without causing the filter bags to burst. To accomplish this test, the submersible pump used to transfer water from Tank 7 into Tank 6 will be re-used. The pump and a short discharge hose will be placed into Tank 6. Prior to mixing the contents of Tank 6, the volume of sediment will be observed and noted on a qualitative scale. The contents of Tank 6 will then be mixed until the sediment material in the tank is in suspension. A metal rod or wood board may be used to guide the effluent end of the pump discharge hose along the bottom of the tank to maximize mixing the tank contents. A 10-micron filter bag that was used during the tank sampling will be connected to the discharge end of a second hose. The filter bag and discharge end of the hose will be placed into empty Tank 7. After Tank 6 contents are well mixed, the hose in Tank 7 will be connected to the pump discharge in Tank 6. The pump in Tank 6 will then pump the liquid contents from Tank 6 into the 10-micron filter bag(s) located in Tank 7.

During the filtration test the system conditions, including the pump specifications listed on the pump identification plate, will be observed and recorded. SAIC will verify that the pumps will adequately suspend the sediments and will pass the sediments through the pump impellers. SAIC will also verify that the pump(s) will produce sufficient head to filter the sediment in the filter bags and that the pump pressure is not so high that it will burst the filter bags during high sediment loadings. After the pumping is complete, the types of material and volumes in Tank 6 and in Tank 7 will be recorded as well as the appearance of the water and the lack of sediment in Tank 7. The volume of sediment captured in the filter bag(s) and the condition of the final filter bag in Tank 7 will be recorded and compared to the remaining volume of sediment in Tank 6. Due to the volume of sediment in Tank 6, all of the sediment in the tank will not be removed during the filtration test

If during the filtration test the pump pressure bursts the filter bag, pumping shall immediately stop. The contents of Tank 7 will then be returned to Tank 6 and Tank 7 will be cleaned as described in 2.1.3. Should the submersible pump pressure be inadequate to pump sufficient volumes of solids into the filter bags, a different pump may be necessary. If continued filtration is not possible with the existing submersible pumps, the dual filtration unit with diaphragm pump may be required for the full filtration field effort. Ideally, all liquid IDW from Tank 6 will be filtered into Tank 7 during the bench scale test.

If the filtration test is successful and sufficient time remains during the first field effort, the solids in Tank 6 may be mechanically removed. Tank 6 sediments will be removed and drummed using techniques similar to Tank 7 sediment removal as described in Section 2.1.3. Pressure washing of Tank 6 will not occur until after the remaining tanks have been emptied and cleaned in the second field effort.

Upon completion of the filtration test the submersible pump will be removed from Tank 6 and decontaminated as described above in Section 2.1.4. After the sediment has been flushed from the assembly, the decontamination water in the 55-gallon drums used for rinsing the pumps will be pumped into a filter bag in Tank 7. The pumps and equipment will then be removed from all tanks and the tanks openings will be covered.

2.3 ANALYTICAL PARAMETERS AND METHODS

Tables 2.1 and 2.2 specify the analytical method numbers, preservation requirements and bottle requirements for each parameter for the samples collected in the performance of the IDW tasks. The samples will be shipped to General Engineering Laboratories at the following address:

General Engineering Laboratories
Attn: Sample Receiving
2040 Savage Road
Charleston, SC 29407
Telephone: (843) 556-8171, Fax: (843) 766-1178

Table 2.1 IDW Bench Scale Testing Phase
Liquid-Analytical Methods and Containers

Location	Parameter	Analytical Method	Bottle Requirements
Tank 4 Unfiltered Liquid			
Tank 4	Gross Alpha and Nonvolatile Beta	900, Gas Flow	500 ml P,G[1] , HNO_3<2
Tank 4	Gamma Spectrometry	HASL 300, Gamma Spec	2,000 ml P,G[1], HNO_3<2
Tank 4	Isotopic Uranium	HASL 300, Alpha Spec	1,000 ml P,G[1], HNO_3<2
Tank 4	Isotopic Thorium	HASL 300, Alpha Spec	1,000 ml P,G[1], HNO_3<2
Tank 4	Radium-226	903.1 Radon Emanation	1,000 ml P,G[1], HNO_3<2
Tank 4	Radium-228	904 Gas Flow	1,000 ml P,G[1], HNO_3<2
Field Filtered Effluent (10 um)			
Tanks 1-6,8	Gross Alpha and Nonvolatile Beta	900, Gas Flow	7-500 ml P,G[1], HNO_3<2
Tanks 1-6,8	Gamma Spectrometry	HASL 300, Gamma Spec	7-2,000 ml P,G[1], HNO_3<2
Tanks 1-6,8	Isotopic Uranium	HASL 300, Alpha Spec	7-1,000 ml P,G[1], HNO_3<2
Tanks 1-6,8	Isotopic Thorium	HASL 300, Alpha Spec	7-1,000 ml P,G[1], HNO_3<2
Tanks 1-6,8	Radium-226	903.1 Radon Emanation	7-1,000 ml P,G[1], HNO_3<2
Tanks 1-6,8	Radium-228	904 Gas Flow	7-1,000 ml P,G[1], HNO_3<2
Tanks 1-6,8	Total Suspended Solids (TSS)	160.2	7-1,000 ml P,G[1], 4°C
Tank 3	Isotopic-Pu	HASL 300, Alpha Spec	1,000 ml P,G[1], HNO_3<2
Tank 3	Sr-90	905.0	1,000 ml P,G[1], HNO_3<2
Lab Filtered Effluent (0.45 um)			
Tanks 1-6,8	Gross Alpha and Nonvolatile Beta	900, Gas Flow	7-500 ml P,G[1]
Tanks 1-6,8	Gamma Spectrometry	HASL 300, Gamma Spec	7-2,000 ml P,G[1]
Tanks 1-6,8	Isotopic Uranium	HASL 300, Alpha Spec	7-1,000 ml P,G[1]
Tanks 1-6,8	Isotopic Thorium	HASL 300, Alpha Spec	7-1,000 ml P,G[1]
Tanks 1-6,8	Radium-226	903.1 Radon Emanation	7-1,000 ml P,G[1]
Tanks 1-6,8	Radium-228	904 Gas Flow	7-1,000 ml P,G[1]
Tank 3	Isotopic-Pu	HASL 300, Alpha Spec	1,000 ml P,G[1]
Tank 3	Sr-90	905.0	1,000 ml P,G[1]
Laboratory Spent 0.45 um Filter			
Tanks 1-6,8	Gamma Spectrometry	HASL 300, Gamma Spec	N/A
Tanks 1-6,8	Isotopic Uranium	HASL 300, Alpha Spec	N/A
Tanks 1-6,8	Isotopic Thorium	HASL 300, Alpha Spec	N/A
Tanks 1-6,8	Radium-226	903.1 Radon Emanation	N/A
Tanks 1-6,8	Radium-228	904 Gas Flow	N/A
Tank 3	Isotopic-Pu	HASL 300, Alpha Spec	N/A
Tank 3	Sr-90	905.0	N/A

1. P,G indicates that either a plastic or glass container can be used.

Table 2.2 IDW Bench Scale Testing Phase
Tank Solids-Analytical Methods and Containers

Location	Parameter	Analytical Method	Bottle Requirements[2]	Priority[3]	
				Tank 3	All Other Tanks
Tanks 1-8	EP Toxicity (TCLP)	All TCLP Parameters	8-8oz, Amber Glass, 4°C	6	4
Tanks 1-8	Corrosivity	9045C	8-4 oz, P,G[1], 4°C	6	4
Tanks 1-8	Ignitability	1010	8-4 oz, P,G[1], 4°C	6	4
Tanks 1-8	Reactivity (Sulfides and Cyanides)	9034- Sulfide 9012A- Cyanide	8-4 oz, P,G[1], 4°C	6	4
Tanks 1-8	Paint Filter Test	9095A	8-8 oz, P,G[1], 4°C	6	4
Tanks 1-8	Gamma Spectrometry	HASL 300, Gamma Spec	8-16oz, P,G[1]	5	3
Tanks 1-8	Isotopic Uranium	HASL 300, Alpha Spec		3	1
Tanks 1-8	Isotopic Thorium	HASL 300, Alpha Spec		4	2
Tanks 1-8	Radium-226	Included in Gamma Spec for Solids	n/a	N/A	N/A
Tanks 1-8	Radium-228	Included in Gamma Spec for Solids	n/a	N/A	N/A
Tank 3	Isotopic-Pu	HASL 300, Alpha Spec	1-4oz, P,G[1]	1	N/A
Tank 3	Sr-90	905.0		2	N/A

1. P,G indicates that either a plastic or glass container can be used.
2. GEL suggests using straight sided Nalgene bottles with wide mouths for solid samples that can be placed in plastic containers.
3. The priority number is the order in which analytical methods should be completed if there is not a sufficient amount of sediment either from direct sampling and/or from sediments collected on the filter to complete all of the analyses. Depending on the sample amount collected, field personnel will request analyses on the Chain of Custody forms in the order identified.

2.4 DECONTAMINATION PROCEDURES

During the liquid IDW Sampling, dedicated sample containers or new disposable tubing will be used to sample each tank. As described in Maxim's original Field Sampling Plan, all equipment used to collect solid IDW samples will be decontaminated after each use by washing the equipment with a mixture of Alconox soap and water, followed by a DI water rinse. Decontamination fluids will be returned to the tanks from which they came or are associated with.

2.5 MANAGEMENT OF IDW FROM FIRST FIELD EFFORT

2.5.1 Vegetation

Vegetation that has been removed from the tanks will be staged on plastic sheeting in a weather protected area identified by USACE. The vegetation will be allowed to continue drying between the first and second field efforts.

2.5.2 Solid Waste

Solid waste generated during theses activities including Personal Protective Equipment (PPE), sediment, filter bags from sampling each tank and the bench scale test, plastic sheeting, disposable tubing, etc. will be placed in 55-gallon drums with a drum liner, labeled, and dated by SAIC personnel. The spent filters and solids from sampling IDW Tank 3 containing Vicinity Property G decontamination water will be placed in a separate lined 55-gallon drum and labeled appropriately. USACE personnel will assist SAIC and MAXIM with moving the drums of solid IDW to the staging area using onsite lifting equipment. The drums will be placed with the other solid IDW generated during previous RI activities. An inventory of the drums and their contents will be kept.

2.5.3 Liquid IDW

Liquid IDW generated during the collection of solid samples will be returned to its respective poly tank. As mentioned in Section 2.2, decontamination water in the 55-gallon drums from rinsing the pumps between sample collections will be filtered in the first field event and placed into Tank 7.

3.0 SECOND FIELD EFFORT

The second field effort will proceed provided that 6 NYCRR Part 380 limits are achieved and approval from an appropriate disposal facility is received. Should the laboratory results be unsatisfactory the following procedure will require revision for disposal of the IDW materials. The primary activities that will take place in the second field effort are the filtration of the liquid IDW and preparation of the liquid and solid IDW and the associated vegetation for disposal.

3.1 METHODS AND PROCEDURES FOR FILTERING IDW LIQUIDS

The following text provides a general description of the filtration process. It is anticipated that more than one operation may be occurring at the same time, i.e., water from one tank may be pumped between tanks while another tank is being cleaned. Tank 7 was prepared for receiving filtered water during the Sampling and Bench Scale Test in the first field effort. The filtration techniques that will take place during this field effort will be similar to those that occurred during the Bench Scale Filtration Test (Section 2.2). Three 2" submersible pumps will be required for this phase of work. An additional 3/4" submersible pump with the capability of removing the water to within 1/8" of the tank floor will be needed for final dewatering and pressure washing of each tank. All pumps, nozzles, and hoses used for this work will be supplied by USACE onsite.

As discussed in Section 2.1.3 and 2.2, Tank 7 will receive 10-micron filtered water. If Tank 6 sediments were not removed and drummed during the first field effort they will be removed as the first step during the second field effort using techniques similar to Tank 7 sediment removal as described in 2.1.3. Tank 6 will be designated to receive 100-micron filtered water. As Tanks 2, 3, and 4 are cleaned, they will receive 10-micron filtered water. The layout of the tanks and a tank flow schematic is shown in Figure 1.

3.1.1 Filter Assemblies

A pipe frame and chains will be used to suspend an expanded metal basket inside Tank 7 and Tank 6. A 100-micron filter bag will be clamped onto the end of a discharge pipe assembly using 2 stainless steel worm gear clamps and the assembly will be placed in the basket in Tank 6. A 10-micron filter bag will be clamped onto the end of an additional discharge pipe assembly using two (2) stainless

steel worm gear clamps and placed in the basket in Tank 7. With the exception of the volume reduction in full tanks (described below), all sediment-laden water will be pumped first through a 100-micron filter bag into Tank 6. From Tank 6 the water will subsequently be pumped through a 10-micron filter bag into other clean tanks as work progresses. Catalog cuts sheets of the filter bags, baskets, and supporting equipment to be used in the IDW filtering are included in the Attachments.

3.1.2 Volume Reduction in Full Tanks

Without mixing the contents of the full tanks (i.e., Tanks 1, 2, and 5) a hose will be connected to a pump and the pump will be suspended approximately 24" above the sediments in the tank. Approximately one-half to two-thirds of the water will be pumped directly through a 10-micron filter bag into a tank designated to receive 10-micron filtered water. The remaining water and sediments in these tanks will be mixed and handled the same as all other tanks holding less water (Tanks 3, 4, and 8).

3.1.3 Tank Cleaning

Tank contents will be mixed using submersible pumps fitted with a short discharge hose until the sediment material in the tank is in suspension. Field observation will be used to determine the optimum mixing method using the submersible pump. A metal rod or wood board may be used to guide the discharge hose along the bottom of the tank to maximize mixing the tank contents. After the sediments in a given tank are in suspension, the short hose will be replaced with a longer hose to enable transfer of tank contents (sediment and water) to a receptacle tank.

After the bulk of the water and sediment has been removed, a skid steer loader may be used to tilt the tanks to facilitate removal of as much water as possible with the pump. Wood blocking under the elevated side of the tank will be utilized for safety. Potable water from Building 429 or the fire hydrant will be used to flush sediment toward the submersible pump. A high-pressure washer and potable water from Building 429 or the fire hydrant will be used to triple rinse the tanks to remove all visible contaminants. All rinse water will be pumped to a receptacle tank. Small amounts of rinse water, 5 gallons or less may remain in the cleaned tanks.

As mentioned above, Tank 6 will be used to receive 100-micron filtered effluent; therefore it will be the last tank to be cleaned. It is anticipated that Tanks 2, 3, 4, and 7 will contain the 10-micron filtered water at the end of the filtration effort; however, this may change based on varying field conditions. The first tanks to be cleaned should be Tank 3 and Tank 4 in order to develop additional storage capacity for 10-micron filtered water. Tanks 1, 2, 5, and 8 will then be cleaned based on field needs and conditions. A transport truck will be used to vacuum the filtered water from the tanks for disposal.

3.1.4 Used Filter Packaging for Disposal

As filter bags fill with sediment, they will be removed from the end of the discharge hose and replaced with new filter bags. The used filter bag will be placed in lined 55-gallon drums for disposal as IDW. Absorbent material will be used as necessary to meet the moisture requirements of the solid waste disposal facility.

3.2 MANAGEMENT OF IDW FROM SECOND FIELD EFFORT

3.2.1 Vegetation

The vegetation that was removed from the tanks during the first and second field efforts will be prepared for placement into IDW drums. If the vegetation is brittle, it will be broken by hand into pieces 8" to 10" long. If the vegetation is still pliable and does not break easily, hand operated lawn shears or hedge clippers will be used to cut the vegetation into pieces 8" to 10" long. The vegetative material will be mixed with the soils and sediments from the tanks or will be placed into drums with other IDW solids for disposal. WCS indicated they could accept this material as long as the vegetative material represents less than 5 to 10 percent of a drum's volume. If necessary, the clippings and sediments will be mixed with a drying agent before placement in lined 55-gallon drums.

3.2.2 Solid Waste

Solid waste generated during theses activities including Personal Protective Equipment (PPE), sediment, filter bags, plastic sheeting, disposable tubing, etc. will be placed in 55-gallon drums with a drum liner and labeled by SAIC personnel. USACE will then assist SAIC and MAXIM with moving the drums of solid IDW to their staging area with the other solid IDW generated during previous RI activities. An inventory of the drums and their contents will be kept.

3.2.3 Disposal of Liquid IDW

Once all liquid IDW has been filtered and collected in the IDW tanks, a transportation subcontractor (tanker truck(s)) will be utilized to transport the liquid for disposal at a wastewater treatment facility. At this time the exact facility is unknown and can only be determined after the analytical classification of the liquids has been completed.

4.0 SITE EXIT

The walls of the tank secondary containment system will be re-assembled to match initial conditions at the start of the IDW sampling efforts. A new containment liner system will not be provided. Sampling equipment will be comprehensively surveyed for total and removable surficial contamination prior to removal from the site. Any contaminated equipment, when compared with the existing surficial contamination limits, will be contained and decontaminated. Personnel contamination surveys will also be conducted before exiting the site.

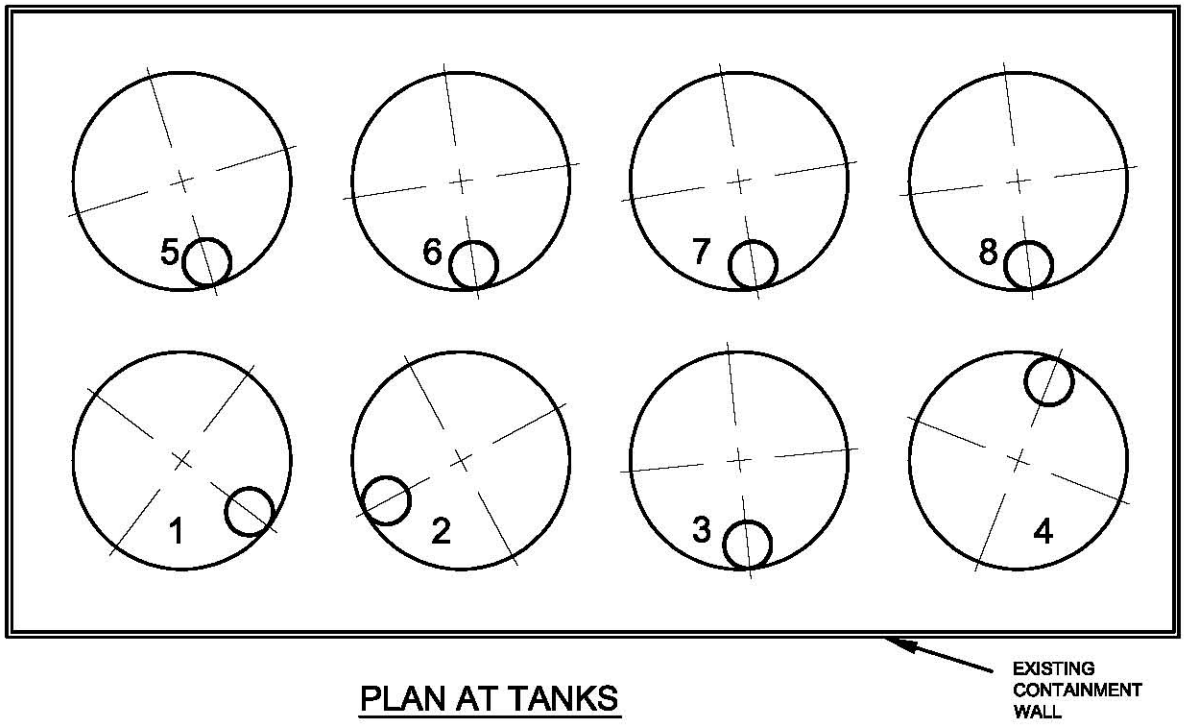
REFERENCES

MAXIM Technologies Inc. (MAXIM) 1999. Field Sampling Plan Remedial Investigation at the Niagara Falls Storage Site, Draft Final. MAXIM, September 1999.

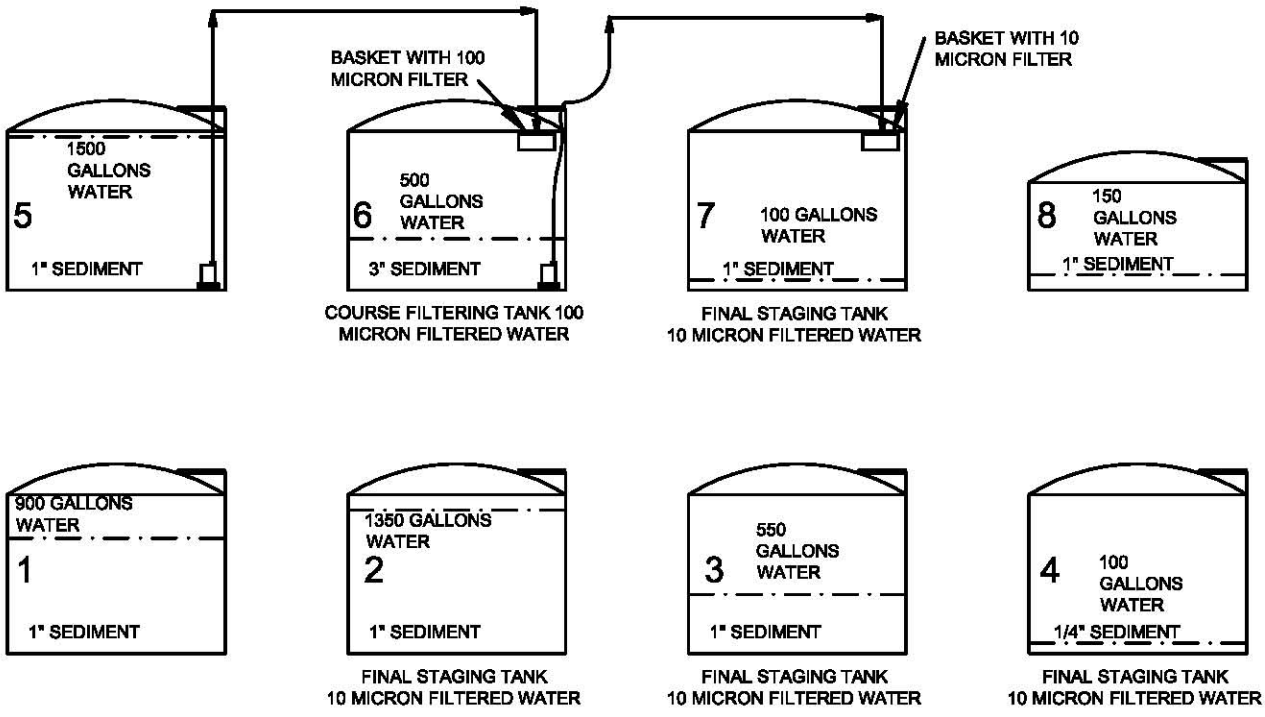
MAXIM Technologies Inc. (MAXIM) 2001. Field Sampling Plan Addendum Pipeline Investigation Remedial Investigation at the Niagara Falls Storage Site. MAXIM, January 2001.

MAXIM Technologies Inc. (MAXIM) 2002. Field Sampling Plan Addendum Pipeline Investigation Remedial Investigation at the Niagara Falls Storage Site. MAXIM, August 2002.

Figures



PLAN AT TANKS



TANK FLOW SCHEMATIC

NOTES:
1. VOLUMES LISTED ARE BASED ON BEST CURRENT ESTIMATES FROM USACE.

2. A TYPICAL PUMPING ARRANGEMENT IS SHOWN, A SIMILAR ARRANGEMENT WILL BE USED FOR ALL TANKS.

U.S. ARMY CORPS OF ENGINEERS
BUFFALO DISTRICT

RI (IDW) WATER SAMPLING AND DISPOSAL PLAN AT TANKS

SAIC. *Science Applications International Corporation* — *Dublin, Ohio*

DRAWN	DATE	SCALE	PROJECT NO.	FIGURE NO.
MRK	SEPT. 2004	AS SHOWN	1321-08-6301	1

Attachments

For information about filter bags, see page 328. For information about micron size, see page 320.

Slip-On Filter Bags

Adapt these filter bags to any existing pipe—no filter housing required. To secure, use a pipe clamp or just tie filter bag on the pipe with sturdy wire. When the bag is full, simply remove it and discard. Ideal for tank car filling, drum loading, and mixing chemicals. Sewn construction. Maximum temperature is 100° F.

Filter Bag

Filter Bag Secured to Pipe

Bag Size, Dia.×Lg.×Wd.	Max. Flow, gpm	5 Micron	10 Micron	15 Micron	25 Micron	50 Micron	75 Micron	100 Micron	200 Micron	Each 1-9	Each 10-Up
Glazed Exterior											
Polyester Felt											
7″×18″×11″	20	**9830K11**	**9830K12**	**9830K13**	**9830K37**	**9830K15**	**9830K16**	**9830K17**	**9830K19**	$2.40	$1.75
7″×33″×11″	50	**9830K21**	**9830K22**	**9830K23**	**9830K38**	**9830K25**	**9830K26**	**9830K27**	**9830K29**	4.93	3.59
14″×36″×22″	125	**9830K62**	**9830K63**	**9830K64**	**9830K65**	**9830K66**	**9830K67**	**9830K68**	**9830K69**	22.04	16.08
Polypropylene Felt											
7″×18″×11″	20	**5859K53**	**5859K54**	_____	**5859K55**	**5859K56**	_____	**5859K57**	_____	2.40	1.75
7″×33″×11″	50	**5859K63**	**5859K64**	_____	**5859K65**	**5859K66**	_____	**5859K67**	_____	4.93	3.59

Bag Size, Dia.×Lg.×Wd.	Max. Flow, gpm	75 Micron	150 Micron	200 Micron	250 Micron	300 Micron	400 Micron	600 Micron	800 Micron	Each 1-9	Each 10-Up
Natural Exterior											
Polyester Mesh											
7″×18″×11″	20	_____	**5859K73**	**5859K74**	**5859K75**	**5859K76**	**5859K77**	**5859K78**	**5859K79**	$3.44	$2.51
7″×33″×11″	50	_____	**5859K83**	**5859K84**	**5859K85**	**5859K86**	**5859K87**	**5859K88**	**5859K89**	4.79	3.69
Nylon Mesh											
7″×18″×11″	20	**9830K32**	**9830K51**	**9830K52**	**9830K53**	**9830K54**	**9830K55**	**9830K56**	**9830K57**	5.55	4.05
7″×33″×11″	50	**9830K36**	**9830K41**	**9830K42**	**9830K43**	**9830K44**	**9830K45**	**9830K46**	**9830K47**	8.88	6.48
14″×36″×22″	125	**9830K72**	**9830K74**	**9830K75**	**9830K76**	**9830K77**	**9830K78**	**9830K79**	**9830K81**	27.76	21.76

Filter-Bag Adapter Heads and Grab-On Filter Bags

Create a filtration system anywhere with these threaded adapter heads and grab-on filter bags.

Adapter heads thread directly to pipe. The filter bag retaining ring fits over the raised lip on the adapter head to hold the filter bag in place. **Connections:** NPT female.

Filter bags (sold separately) are specially constructed for use without a housing and must be used with our adapter heads. Bags have a galvanized steel ring sewn into the opening that slips over the adapter head to hold the filter bag in place. Sewn construction. Maximum temperature is 100° F. *Polyester* and *polypropylene felt filter bags* have a glazed exterior. *Nylon monofilament mesh filter bags* are more durable and are reusable.

Bag Shown with Adapter Head

Adapter Heads

FOR USE WITH 4 3/32″ DIA. BAGS

Fits Pipe Size, NPT Male	Polypropylene Each	Type 316 Stainless Steel Each
¾″	**98295K11** $13.13	**98295K101** $78.75
1″	**98295K12** 13.13	**98295K102** 78.75
1¼″	**98295K13** 13.13	**98295K103** 78.75

FOR USE WITH 7″ DIA. BAGS

Fits Pipe Size, NPT Male	Polypropylene Each	Type 316 Stainless Steel Each
1½″	**98295K23** $17.50	**98295K43** $82.35
2″	**98295K25** 17.50	**98295K45** 87.50
3″	_____ _____	**98295K47** 128.74

Filter Bags

Bag Size, Dia.×Lg.	Max. Flow, gpm	1 Micron	5 Micron	10 Micron	15 Micron	25 Micron	50 Micron	100 Micron	200 Micron	Each 1-9	Each 10-Up
Polyester Felt Bags with Galvanized Steel Retaining Ring											
4 3/32″× 8″	10	**98295K1**	**98295K2**	**98295K3**	**98295K4**	**98295K5**	**98295K6**	**98295K8**	**98295K9**	$2.05	$1.59
4 3/32″×14″	15	**98295K21**	**98295K22**	**98295K26**	**98295K27**	**98295K28**	**98295K29**	**98295K32**	**98295K33**	2.80	2.08
7″ ×16½″	25	**98295K48**	**98295K51**	**98295K52**	**98295K53**	**98295K54**	**98295K55**	**98295K57**	**98295K58**	3.20	2.51
7″ ×32″	55	**98295K59**	**98295K61**	**98295K62**	**98295K63**	**98295K64**	**98295K65**	**98295K67**	**98295K69**	5.19	3.78
Polypropylene Felt Bags with Galvanized Steel Retaining Ring											
4 3/32″× 8″	10	**9308T11**	**9308T12**	**9308T13**	**9308T14**	**9308T15**	**9308T16**	**9308T18**	**9308T19**	2.70	1.86
4 3/32″×14″	15	**9308T31**	**9308T32**	**9308T36**	**9308T37**	**9308T38**	**9308T39**	**9308T42**	**9308T43**	3.50	2.41
7″ ×16½″	25	**9308T58**	**9308T61**	**9308T62**	**9308T63**	**9308T64**	**9308T65**	**9308T67**	**9308T68**	4.22	2.90
7″ ×32″	55	**9308T79**	**9308T81**	**9308T82**	**9308T83**	**9308T84**	**9308T85**	**9308T86**	**9308T87**	6.36	4.38

Bag Size, Dia.×Lg.	Max. Flow, gpm	50 Micron	100 Micron	200 Micron	300 Micron	400 Micron	600 Micron	800 Micron	1000 Micron	Each 1-9	Each 10-Up
Nylon Monofilament Bags with Galvanized Steel Retaining Ring											
4 3/32″× 8″	10	**98295K34**	**98295K36**	**98295K38**	**98295K41**	**98295K42**	**98295K44**	**98295K46**	**98295K49**	$2.99	$2.19
4 3/32″×14″	15	**98295K68**	**98295K89**	**98295K92**	**98295K94**	**98295K95**	**98295K96**	**98295K97**	**98295K98**	3.69	2.70
7″ ×16½″	25	**98295K14**	**98295K16**	**98295K72**	**98295K74**	**98295K75**	**98295K76**	**98295K77**	**98295K78**	5.55	4.05
7″ ×32″	55	**98295K17**	**98295K19**	**98295K82**	**98295K84**	**98295K85**	**98295K86**	**98295K87**	**98295K88**	8.88	6.48

Filter Bag Seating Tool

Position your filter bags perfectly every time with this filter bag seating tool. The rounded head pushes your bag to the bottom of the filter-bag housing, seating it completely. Made of lightweight, corrosion-resistant 6061-T6 aluminum with a T-handle. Tool measures 31 13/16″ Lg.×5″ Head Dia.

9291T44 ..... **Each** $146.67

Filter Bag Housing Magnets

Extend the life of your filter bag by two to three times when you place one of these magnets inside your filter bag. Magnets attract ferrous metal particles away from the filter bag before they cause damage. When it's time for cleaning, slide the magnet out of the sleeve to remove the metal filings. The shell is constructed of corrosion-resistant Type 304 stainless steel, the magnet is a ceramic magnet with 25 lbs. of pull on contact. Max. temperature is 300° F.

For Bag Trade Size	Magnet Shaft, Dia.×Lg.	Each
1	1″×15″	**9324T21** $208.33
2	1″×30″	**9324T42** 241.67
3	1″× 8″	**9324T11** 191.67
4	1″×14″	**9324T12** 208.33
8	1″×20″	**9324T31** 225.75
9	1″×29″	**9324T34** 241.67
12	1″×34″	**9324T54** 266.67

For more information about micron size, see page 320.

Heat-Welded Polyester Felt Filter Bags

The glazed finish and heat-welded construction of these bags eliminates pinholes and loose threads for a cleaner final product. The retaining ring and integral handle are made of polypropylene. Maximum temperature is 200° F.

Bag Size, Dia.×Lg.	Trade Size	Max. Flow, gpm	1 Micron	5 Micron	10 Micron	25 Micron	50 Micron	100 Micron	200 Micron	Each 1-9	Each 10-Up
4 3/32" × 8"	3	25	9316T11	9316T12	9316T13	9316T14	9316T15	9316T16	9316T17	$3.82	$2.63
4 3/32" × 14"	4	50	9316T21	9316T22	9316T23	9316T24	9316T25	9316T26	9316T27	4.61	3.17
5 1/2" × 21"	8	100	9316T31	9316T32	9316T33	9316T34	9316T35	9316T36	9316T37	5.49	3.77
5 1/2" × 32"	9	150	9316T41	9316T42	9316T43	9316T44	9316T45	9316T46	9316T47	7.32	5.03
7" × 16 1/2"	1	100	9316T51	9316T52	9316T53	9316T54	9316T55	9316T56	9316T57	5.73	3.94
7" × 32"	2	220	9316T61	9316T62	9316T63	9316T64	9316T65	9316T66	9316T67	7.88	5.41
8 1/4" × 34"	12	275	9316T71	9316T72	9316T73	9316T74	9316T75	9316T76	9316T77	9.47	6.51

Heat-Welded Felt Filter Bags with Pressure Seal Retaining Ring

The integral polypropylene retaining ring on these bags doubles as an extra seal that increases in strength as the pressure in your housing rises. The ring has integral handles for easy bag changing. Filter bags have heat-welded construction for reliable joints with no pin holes or loose sewing threads. ***Standard*** filter bags have a singed exterior. ***Long-life*** filter bags are made of an extra thick fiber blend media with finer fibers for greater dirt-holding capacity than standard felt bags. Bags have a glazed exterior for minimal fiber migration.

Bag Size, Dia.×Lg.	Trade Size	Max. Flow, gpm	1 Micron	5 Micron	10 Micron	25 Micron	50 Micron	100 Micron	200 Micron	Each 1-9	Each 10-Up
Standard Felt Bags											
Polyester—*Maximum Temperature is 302° F*											
7" × 17"	1	90	9299T31	9299T32	9299T33	9299T34	9299T35	9299T37	9299T38	$3.71	$2.96
7" × 32"	2	180	9299T41	9299T42	9299T43	9299T44	9299T45	9299T47	9299T48	5.20	4.16
Polypropylene—*Maximum Temperature is 194° F*											
7" × 17"	1	90	9299T11	9299T12	9299T13	9299T14	9299T15	9299T16	9299T17	3.71	2.96
7" × 32"	2	180	9299T21	9299T22	9299T23	9299T24	9299T25	9299T26	9299T27	5.20	4.16
Long-Life Felt Bags											
Polyester—*Maximum Temperature is 302° F*											
7" × 17"	1	65	9301T81	9301T82	9301T83	9301T84	9301T85	9301T86	_____	6.89	5.51
7" × 32"	2	135	9301T91	9301T92	9301T93	9301T94	9301T95	9301T96	_____	9.75	7.80
Polypropylene—*Maximum Temperature is 194° F*											
7" × 17"	1	65	9301T61	9301T62	9301T63	9301T64	9301T65	9301T66	_____	6.89	5.51
7" × 32"	2	135	9301T71	9301T72	9301T73	9301T74	9301T75	9301T76	_____	9.75	7.80

Oil-Absorbent Polypropylene Microfiber Filter Bags

The 100% oil absorbent polypropylene materials remove oil from water and water-based coolants. Sewn construction. Maximum temperature is 200° F.

Bags with a *polypropylene retaining ring* have an integral handle. Bags with a *galvanized steel retaining ring* have a sewn-in handle.

With Polypropylene Ring

With Galvanized Steel Ring

Bag Size, Dia.×Lg.	Trade Size	Max. Flow, gpm	WITH POLYPROPYLENE RING: 10 Micron	25 Micron	90 Micron	Each 1-9	Each 10-Up	WITH GALVANIZED STEEL RING: 10 Micron	25 Micron	90 Micron	Each 1-9	Each 10-Up
4 3/32" × 8"	3	10	9309T11	9309T21	9309T31	$7.07	$4.99	98185K33	98185K12	98185K43	$4.74	$3.42
4 3/32" × 14"	4	20	9309T12	9309T22	9309T32	10.41	7.35	98185K34	98185K14	98185K44	7.32	5.20
5 1/2" × 21"	8	40	9309T13	9309T23	9309T33	16.76	11.83	98185K35	98185K16	98185K45	11.84	8.55
5 1/2" × 32"	9	60	9309T14	9309T24	9309T34	22.62	15.97	98185K36	98185K18	98185K46	16.16	11.67
7" × 16 1/2"	1	40	9309T15	9309T25	9309T35	16.90	11.93	98185K31	98185K22	98185K41	11.84	8.55
7" × 32"	2	85	9309T16	9309T26	9309T36	27.93	19.71	98185K32	98185K24	98185K42	18.03	14.43
8 1/4" × 34"	12	100	9309T17	9309T27	9309T37	31.72	22.39	98185K37	98185K19	98185K47	22.62	16.33

Absolute-Rated Microfiber Filter Bags

These multilayered microfiber filter bags are absolute rated for consistent, reliable performance.

Polyester microfiber bags remove 99% of particles. Made of multiple layers for extended life and higher dirt-holding capacity. Sewn construction. Bags with micron sizes of 1 to 10 include a polyester felt prefilter and polyester microfiber media with polyester inner and outer covers. Micron sizes 25 to 100 include a glazed polyester felt outer layer with a polyester felt prefilter. ***Polypropylene microfiber bags*** are made of multilayer microfiber media that lasts up to three times longer than conventional felt bags, great for high-performance filtering jobs. Bags have a thermally bonded melt-blown media, heat-welded seams (unless noted), and remove at least 90% of particles. Media is FDA compliant, except where noted.

With Sewn-In Polyester Handle

With Integral Polypropylene Handle

With Welded Nylon Handle

Bag Size, Dia.×Lg.	Trade Size	Max. Flow, gpm	1 Micron	2.5 Micron	5 Micron	Each 1-9	Each 10-Up	10 Micron	25 Micron	50 Micron	100 Micron	Each 1-9	Each 10-Up
Polyester Microfiber Bags with Type 304 Stainless Steel Retaining Ring and Sewn-In Polyester Handle—*Max. Temperature is 300° F*													
4 3/32" × 8"	3	25	9844K31	9844K32	9844K33	$10.49	$8.75	9844K34	9844K35	9844K36	9844K38	$5.49	$3.77
4 3/32" × 14"	4	50	9844K41	9844K42	9844K43	14.89	10.94	9844K44	9844K45	9844K46	9844K48	6.84	4.70
5 1/2" × 21"	8	100	9844K51	9844K52	9844K53	21.48	14.77	9844K54	9844K55	9844K56	9844K58	8.91	6.13
5 1/2" × 32"	9	150	9844K61	9844K62	9844K63	31.57	25.16	9844K64	9844K65	9844K66	9844K68	10.66	7.33
7" × 16 1/2"	1	100	9844K11	9844K12	9844K13	19.69	14.77	9844K14	9844K15	9844K16	9844K18	8.91	6.13
7" × 32"	2	220	9844K21	9844K22	9844K23	30.96	25.16	9844K24	9844K25	9844K26	9844K28	12.73	8.75
8 1/4" × 34"	12	275	9844K71	9844K72	9844K73	40.71	31.17	9844K74	9844K75	9844K76	9844K78	15.91	10.94
Polypropylene Microfiber Bags with Polypropylene Retaining Ring and Integral Polypropylene Handle—*Max. Temperature is 200° F*													
4 3/32" × 8"	3	15	51695K11	51695K19	51695K16	8.96	7.33	51695K13	51695K14	51695K18	51695K17	8.89	7.27
4 3/32" × 14"	4	35	51695K21	51695K29	51695K26	9.89	8.09	51695K23	51695K24	51695K28	51695K27	9.82	8.04
7" × 16 1/2"	1	60	51695K51	51695K59	51695K56	12.18	9.96	51695K53	51695K54	51695K58	51695K57	11.98	9.80
7" × 32"	2	100	51695K61	51695K69	51695K66	15.60	12.76	51695K63	51695K64	51695K68	51695K67	15.27	12.49
Polypropylene Microfiber Bags with Galvanized Steel Retaining Ring and Welded Nylon Handle—*Max. Temperature is 200° F*													
5 1/2" × 20"	8	50	51695K31	51695K39★	51695K36	11.56	9.63	51695K33	51695K34	51695K38	51695K37	11.50	9.58
5 1/2" × 31"	9	60	51695K41	51695K49★	51695K46	13.64	11.16	51695K43	51695K44	51695K48	51695K47	13.40	10.96
8 1/4" × 34"	12	275	51695K71★	51695K79★	51695K76★	35.00	24.06	51695K73★	51695K74★	51695K78★	51695K77★	15.91	10.94

★ Has Type 304 stainless steel retaining ring and sewn-in polypropylene handle. Bags have sewn construction, media is not FDA compliant.

Baskets & Bulk Containers

Nestable Tote Baskets


A


B

(A) Steel—The frame is 8-gauge steel; mesh is 11-gauge steel. Baskets have a nickel-chrome finish. Handles have a vinyl grip.

(B) Polypropylene—Baskets have wire handles. To Order Please specify color: blue or red.

Top Outside Size♦, Lg.×Wd.×Ht.	Mesh Openings		Each
(A) Steel			
19¾″×13¼″×10″	1⅜″×1″	4025T11	$29.45
(B) Polypropylene			
17″ ×12″ × 8½″	⅜″×1″	4248T11	7.56
18⅜″×12½″× 9¾″	⅝″× ⅝″	4248T51	10.47

♦ Not including handles.

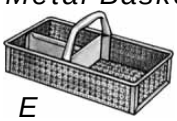
Epoxy-Coated Wire Baskets


C


D

Top Outside Size, Lg.×Wd.×Ht.	Mesh Openings		Each
(C) Straight Side—*Color is blue.*			
11″× 6″× 3½″	¼″×3¼″	4244T1	$39.34
14″×11″× 3½″	¼″×3¼″	4244T2	46.67
20″×11″× 3½″	¼″×3¼″	4244T3	53.67
(D) Tapered Side—*Nestable. Color is white.*			
21″×13″× 3¼″	1¼″×13/16″	42865T11	11.44
21″×13″× 7⅛″	1¼″×13/16″	42865T12	13.62
21″×13″×11⅛″	1¼″×13/16″	42865T13	18.49
21″×17″× 3¼″	1¼″×13/16″	42865T21	12.10
21″×17″× 7⅛″	1¼″×13/16″	42865T22	14.46
21″×17″×11⅛″	1¼″×13/16″	42865T23	19.24
21″×21″× 7⅛″	1¼″×13/16″	42865T32	15.80
21″×21″×11⅛″	1¼″×13/16″	42865T33	21.23

Metal Baskets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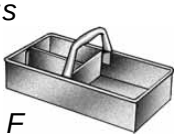
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G

Top Outside Size♦, Lg.×Wd.×Ht.	Ga.	Mesh Openings	Compartments		Each
(E) Perforated Steel—*Rubber feet. Gray powder-coated finish.*					
18″ × 9¾″×4½″	24	5/16″ Dia.	3	4035T1	$25.57
18″ × 9¾″×4½″	24	5/16″ Dia.	1	4035T2	23.16
(F) Aluminum—*Satin finish.*					
18″ × 9¾″×4½″	24	_____	3	4035T3	29.30
20½″×10¾″×4¾″	24	_____	3	4035T5	31.03
20½″×10¾″×4¾″	24	_____	1	4035T6	28.83

♦ Not including handles.

Top Outside Size♦, Lg.×Wd.×Ht.	Ga.	Mesh Openings	Compartments		Each
(G) Expanded Steel—*Baskets are stackable. Zinc-plated finish.*					
17 5/16″×10″ ×4½″	18	¼″×¾″	1	4354T12	$34.00
17 5/16″×10″ ×4½″	18	½″×1″	1	4354T11	29.52
22 5/16″×13¼″×6″	18	¼″×¾″	1	4354T14	45.58
22 5/16″×13¼″×6″	18	½″×1″	1	4354T13	39.20
25 5/16″×13¼″×6″	18	½″×1″	1	4354T16	44.30
(G) Expanded Type 304 Stainless Steel—*Baskets are stackable.*					
17 5/16″×10″ ×4½″	18	¼″×¾″	1	20165T42	95.27
17 5/16″×10″ ×4½″	18	½″×1″	1	20165T41	79.43
22 5/16″×13¼″×6″	18	¼″×¾″	1	20165T44	141.26
22 5/16″×13¼″×6″	18	½″×1″	1	20165T43	109.36
25 5/16″×13¼″×6″	18	½″×1″	1	20165T45	115.64

♦ Not including handles.

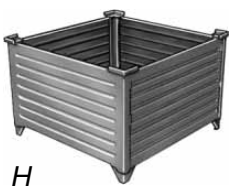
Collapsible Wire Bulk Containers


Container with Half-Drop Door on Length Side; without Casters

All containers have an underclearance for four-way forklift entry. TheyÕre steel with a gray painted finish. ***Containers without casters*** can be stacked up to four high. *Note*: Do not stack on containers with casters. ***Containers with casters*** have two rigid and two swivel casters with 4″ Dia.×2″ Wd. phenolic wheels.

O'all Size, Lg.×Wd.	Cap., lbs.	Ga.	Mesh Openings	Underclearance	Without Casters Ht.		Each	With Casters Ht.		Each
With Half-Drop Door on Length Side										
32″×20″	750	5	1¼″×1¼″	4″	22″	5066T41	$86.83	28″	5066T15	$158.05
32″×20″	1500	11	½″× ½″	4″	22″	5066T43	106.75	28″	5066T16	176.67
40″×32″	4000	2	2″ ×2½″	4½″	35″	5066T31	116.07	36⅛″	5066T18	205.36
48″×40″	4000	2	2″ ×2½″	4½″	30½″	5066T56	155.36	31⅜″	5066T19	244.64
48″×40″	4000	2	2″ ×2½″	4½″	36½″	5066T32	141.07	37⅝″	5066T33	230.36
48″×40″	4000	2	2″ ×2½″	4½″	43″	5066T72	151.79	44⅛″	5066T34	236.84
With Half-Drop Door on Width Side										
48″×40″	4000	2	2″ ×2½″	4½″	36⅝″	5066T26	137.29	37¾″	5066T35	222.03

Bulk Containers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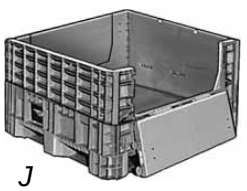
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K


L

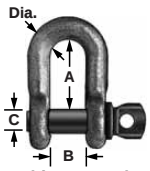

M

Overall Size, Lg.×Wd.×Ht.	Cap., lbs. •	Cap., lbs. ▲	Stacking Height	Wall Thick.	Underclearance	Forklift Entry	Color	Containers Each	Lids Each
(H) Corrugated Unpainted Steel—*Bottom thickness is 12 gauge (unless noted).*									
35″ ×30″ ×28¼″	4000	4000	5	13 ga.	4″	4-Way	Gray	4546T16★ $155.29	_____ _____
42″ ×42″ ×22¼″	4000	4000	5	13 ga.	4″	4-Way	Gray	4546T13 165.95	_____ _____
42″ ×42″ ×28¼″	4000	4000	5	13 ga.	4″	4-Way	Gray	4546T17 188.48	_____ _____
48″ ×48″ ×28¼″	4000	4000	5	13 ga.	4″	4-Way	Gray	4546T18 221.71	_____ _____
(J) Collapsible High-Density Polyethylene—*Furnished with a half-drop door on each length side. Smooth interior.*									
48″ ×40″ ×34″	2300	1500	3	1½″ Ribbed	3½″	4-Way	Gray	45775T23 223.81	45775T13 $53.70
48″ ×40″ ×39″	2300	1500	3	1½″ Ribbed	3½″	4-Way	Gray	45775T26 247.50	45775T13 53.70
48″ ×45″ ×25″	2300	1500	4	1¾″ Ribbed	3½″	4-Way	Gray	45775T29 223.81	45775T14 56.60
48″ ×45″ ×34″	2300	1500	4	1¾″ Ribbed	3½″	4-Way	Gray	45775T33 235.71	45775T14 56.60
(K) Medium-Density Polyethylene—*Made of FDA compliant resins, seamless, and nestable. Lid required for stacking.*									
50″ ×42″ ×36″	2000	2000	2	¼″	4″	4-Way	White	3674K11 441.28	3674K16 158.97
50″ ×42″ ×36″	2000	2000	2	¼″ Each♥	4″	4-Way	White	3674K21 590.08	3674K23 159.10
50″ ×42″ ×45″	2000	2000	2	¼″	4″	4-Way	White	3674K13 498.63	3674K16 158.97
52″ ×44″ ×42″	2000	2000	2	¼″ Each♥	4″	4-Way	White	3674K22 686.57	3674K24 159.10
(L) Low-Density Polyethylene with Lid—*Made of FDA compliant resins and is nestable. Lid required for stacking.*									
51½″×22½″ ×19″	550	325	4	3/16″	4″	2-Way	Blue	42115T34 141.32	_____ _____
41″ ×28″ ×29″	500	430	3	3/16″	4″	2-Way	Blue	21065T44■ 153.08	_____ _____
42″ ×34″ ×42″	800	800	2	3/16″	4″	2-Way	Blue	21065T45■ 239.28	_____ _____
(M) Polypropylene—*Made of FDA compliant resins, UV stabilized, and has a smooth interior.*									
47″ ×47″ ×28″	1200	1060	8	_____	4¼″	2-Way	Ivory	4508T51 216.67	4508T42 72.00

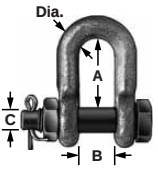
¥ When not stacked. ▲ When stacked. ★ Bottom thickness is 13 gauge. ♥ Has a double-wall construction. ■ Container has handles.

D-Shackles—For Lifting

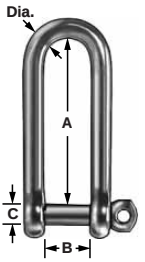
Forged D-Shackles



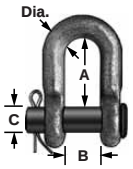
With Screw Pin



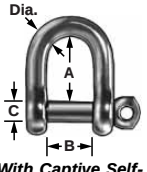
With Safety Pin



Long Bow with Captive Self-Locking Screw Pin



With Round Pin



With Captive Self-Locking Screw Pin

Also known as chain shackles. Their elongated bow restricts movement of the rigging lines, reducing wear on the shackle.

Galvanized steel shackles have alloy steel pins that are heat-treated and tempered. Meet Fed. Spec. RR-C-271D. ***Type 316 stainless steel*** shackles are an excellent choice for use in marine, chemical, and other environments where rust and corrosion are a problem. *Long-bow* shackles have an extended body to increase the reach of your connection.

Screw pins screw into position without the use of tools. Ideal for applications where shackle is frequently removed. Not for use if there will be movement or vibration of the pin. ***Safety pins*** are the most secure choice for overhead lifting. Also known as bolt, nut, and cotter (BNC) pins, safety pins consist of a round pin secured with a nut and a cotter pin. ***Round pins*** (also known as loose pins) have a cotter pin that secures the pin end for temporary installations.

Shackles with ***self-locking screw pins*** have indentations to lock the pin in place as it is tightened, regardless of movement or vibration of the pin. ***Captive self-locking screw pins*** also have a slight edge on the tip of the screw pin that prevents separation from the shackle to eliminate lost pins, even when the shackle is fully opened.

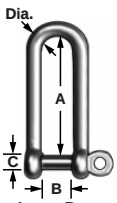
Note: Do not side load. Work load limits are based on loads applied in direct tension to a straight length of chain or wire rope. Only one connection should be made on each shackle.

Dia.	(B)	(C)	Pkg. Qty.	Work Load Limit, lbs.	With Screw Pin (A)		Each Partial Pkg.	Each Full Pkg.	With Safety Pin (A)		Each Partial Pkg.	Each Full Pkg.	With Round Pin (A)		Each Partial Pkg.	Each Full Pkg.
Galvanized Steel																
1/4"	15/32"	5/16"	25	1,000	1 1/8"	**3560T44**	$3.61	$3.22	3/4"	**3556T26**	$6.57	$6.04	1 1/8"	**3561T44**	$3.38	$2.89
5/16"	17/32"	3/8"	25	1,500	1 1/4"	**3560T45**	4.00	3.52	1"	**3556T27**	7.39	6.80	1 1/4"	**3561T45**	3.47	2.95
3/8"	21/32"	7/16"	25	2,000	1 7/16"	**3560T46**	4.61	4.04	1 7/32"	**3556T28**	8.28	7.62	1 7/16"	**3561T46**	3.67	3.12
7/16"	3/4"	1/2"	25	3,000	1 11/16"	**3560T47**	6.04	5.13	1 7/16"	**3556T29**	10.65	9.80	1 11/16"	**3561T47**	5.95	5.12
1/2"	13/16"	5/8"	25	4,000	1 5/8"	**3560T48**	6.93	5.89	1 5/8"	**3556T14**	10.30	9.16	1 7/8"	**3561T48**	6.63	5.62
5/8"	1 1/16"	3/4"	25	7,170	2"	**3560T49**	11.32	9.77	2"	**3556T15**	13.90	12.36	2"	**3561T49**	9.59	8.82
3/4"	1 1/4"	7/8"	10	10,475	2 3/8"	**3560T51**	15.58	13.54	2 3/8"	**3556T16**	22.08	19.20	2 3/8"	**3561T51**	16.16	14.22
7/8"	1 7/16"	1"	10	13,000	2 13/16"	**3560T52**	21.14	17.92	2 13/16"	**3556T17**	31.95	28.04	3 5/16"	**3561T52**	23.60	20.22
1"	1 11/16"	1 1/8"	10	17,000	3 3/16"	**3560T53**	27.95	23.79	3 3/16"	**3556T18**	42.52	36.69	3 3/4"	**3561T53**	31.16	26.80
1 1/8"	1 13/16"	1 1/4"	10	19,000	4 1/4"	**3560T54**	40.41	34.19	4 1/4"	**3556T19**	48.10	40.34	4 1/4"	**3561T54**	38.09	32.55
1 1/4"	2 1/32"	1 3/8"	10	24,000	3 15/16"	**3560T55**	61.49	52.21	4 11/16"	**3556T21**	77.49	65.79	4 11/16"	**3561T55**	63.56	53.96
1 3/8"	2 1/4"	1 1/2"	10	27,000	5 1/4"	**3560T86**	78.16	66.13	5 1/4"	**3556T32**	97.00	82.36	5 1/4"	**3561T76**	76.87	65.26
1 1/2"	2 3/8"	1 5/8"	5	34,000	5 3/4"	**3560T57**	95.64	81.21	5 3/4"	**3556T23**	116.75	98.37	5 3/4"	**3561T57**	94.27	80.04
1 3/4"	2 7/8"	2"	5	50,000	7"	**3560T58**	166.51	146.12	7"	**3556T24**	198.14	177.50	7"	**3561T58**	154.00	131.19
2"	3 1/4"	2 1/4"	5	70,000	7 3/4"	**3560T59**	210.60	188.67	7 3/4"	**3556T25**	259.56	232.52	7 3/4"	**3561T59**	203.00	182.70
Type 316 Stainless Steel																
1/4"	15/32"	5/16"	10	1,000	___	**35895T11**	6.02	5.34	___	___	___	___	___	___	___	___
5/16"	1/2"	3/8"	10	1,500	___	**35895T12**	7.13	6.33	___	___	___	___	___	___	___	___
3/8"	5/8"	7/16"	10	2,000	1 1/4"	**35895T13**	10.25	9.11	1 1/4"	**35895T23**	21.78	19.60	1 1/4"	**35895T33**	16.22	14.60
1/2"	13/16"	5/8"	10	4,000	1 37/64"	**35895T14**	18.57	16.60	1 37/64"	**35895T24**	38.11	34.30	1 37/64"	**35895T34**	29.80	26.82
5/8"	1 1/16"	3/4"	10	6,000	1 15/16"	**35895T15**	32.93	29.64	1 15/16"	**35895T25**	57.18	51.46	1 15/16"	**35895T35**	50.00	45.00
3/4"	1 3/16"	7/8"	10	8,000	2 3/8"	**35895T46**	51.20	46.08	2 3/8"	**35895T56**	93.73	84.36	2 3/8"	**35895T66**	85.31	76.78
7/8"	1 29/64"	1"	10	10,000	2 7/8"	**35895T47**	88.58	79.72	2 7/8"	**35895T57**	133.40	120.06	2 7/8"	**35895T67**	129.20	116.28
1"	1 43/64"	1 1/8"	10	12,000	3 1/4"	**35895T48**	101.33	91.20	3 1/4"	**35895T58**	195.93	180.26	3 1/4"	**35895T68**	177.40	159.66

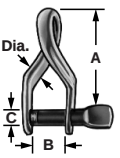
Dia.	(B)	Pkg. Qty.	With Self-Locking Screw Pin (A)	(C)	Work Load Limit, lbs.		Each Partial Pkg.	Each Full Pkg.	With Captive Self-Locking Screw Pin (A)	(C)	Work Load Limit, lbs.		Each Partial Pkg.	Each Full Pkg.
Type 316L Stainless Steel														
5/32"	5/16"	10	17/32"	5/32"	387	**3824T61**	$4.84	$4.26	1/2"	3/16"	550	**3824T41**	$7.34	$6.46
3/16"	13/32"	10	5/8"	3/16"	550	**3824T32**	5.57	4.90	5/8"	1/4"	825	**3824T42**	8.91	7.84
1/4"	15/32"	10	25/32"	1/4"	881	**3824T33**	7.20	6.34	25/32"	9/32"	1,212	**3824T43**	11.41	10.04
5/16"	5/8"	10	1 1/32"	5/16"	1,487	**3824T34**	11.32	9.96	1 1/32"	11/32"	2,000	**3824T44**	17.48	15.38
13/32"	25/32"	10	1 5/16"	13/32"	2,375	**3824T35**	18.57	16.34	1 5/16"	7/16"	2,875	**3824T45**	27.43	24.14
15/32"	15/16"	10	1 17/32"	15/32"	3,300	**3824T56**	32.45	28.56	1 17/32"	1/2"	3,850	**3824T46**	41.70	36.70
Type 316L Stainless Steel with Long Bow														
5/32"	5/16"	10	7/8"	5/32"	387	**3841T61**	5.79	4.86	1 7/32"	3/16"	550	**3841T51**	9.33	7.84
3/16"	13/32"	10	1 5/32"	3/16"	550	**3841T42**	7.07	5.94	1 17/32"	1/4"	825	**3841T52**	11.05	9.28
1/4"	15/32"	10	1 5/16"	1/4"	881	**3841T43**	9.14	7.68	1 13/16"	9/32"	1,212	**3841T53**	14.95	12.56
5/16"	5/8"	10	1 25/32"	5/16"	1,487	**3841T44**	14.45	12.14	2 7/16"	11/32"	2,000	**3841T54**	23.74	19.94

D-Shackles—Not for Lifting

Type 316L Stainless Steel D-Shackles



Long-Bow



Twisted

YouÕll get increased flexibility when connecting fittings or chain to these D-shackles. Excellent for use in chemical, marine, and other corrosive environments. The screw pins screw into position without the use of tools. Ideal for applications where shackle is frequently removed. Not for use if pin will move or vibrate. Package quantity is 10. Not for lifting.

Long-bow shackles have an extended body to increase the reach of your connection.

Twisted shackles have a spiral design that allows objects to be oriented 90¡ to the plane in which they are hung.

Note: Do not side load. Work load limits are based on loads applied in direct tension to a straight length of chain or wire rope. Adding more than one connection will decrease the work load limit.

Dia.	(A)	(B)	(C)	Work Load Limit, lbs.		Each Partial Pkg.	Each Full Pkg.
Long Bow—*Cast*							
3/16"	1 1/2"	7/16"	3/16"	530	**35685T42**	$4.43	$3.93
1/4"	1 3/4"	1/2"	1/4"	750	**35685T43**	5.48	4.87
5/16"	2 5/16"	11/16"	5/16"	1320	**35685T44**	6.75	6.00
3/8"	2 7/8"	25/32"	3/8"	1700	**35685T45**	10.25	9.11
Twisted—*Stamped*							
5/32"	7/8"	13/32"	5/32"	352	**33845T22**	5.02	4.46
3/16"	1 1/16"	13/32"	3/16"	616	**33845T23**	6.07	5.39
1/4"	1 9/16"	9/16"	1/4"	1012	**33845T24**	7.59	6.74
5/16"	1 7/8"	5/8"	5/16"	1584	**33845T25**	12.92	11.49
3/8"	2 1/16"	5/8"	3/8"	2552	**33845T26**	24.22	21.53
1/2"	2 1/2"	3/4"	1/2"	3388	**33845T27**	29.14	25.90

Warning! *Never exceed work load limits.*

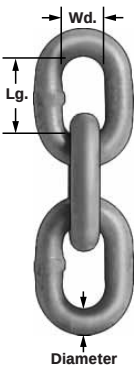
Steel Chain

All chain is made in accordance with NACM (National Association of Chain Manufacturers) standards and is embossed with its NACM grade designation. Work load limits are stated at room temperature and are reduced in heat.

Maximum Strength (Grade 70)

Also known as transport chain and System 7 chain. This chain is approximately 20% stronger than our high strength (Grade 40) chain and about 50% stronger than our medium strength (Grade 30) chain. Use for load binding, towing, and logging jobs. Chain is made of high-carbon steel and is heat treated. Meets D.O.T. 49 CFR, 393.102 for load securement. We offer 5-, 10-, 25-, 50-, and 100-ft. lengths, as well as any length you may need.

Zinc-plated finish is gold. *Poly-coated finish* is gray. *Cold-galvanized finish* provides extra corrosion resistance.



Trade Size Inch	mm	Diameter	Inside Link Size Wd.	Lg.	Work Load Limit, lbs.		Per Foot 1-49	50-Up
Zinc-Plated Finish								
1/4″	7	0.28″	0.50″	1.24″	3,150	3363T91	$1.86	$1.58
5/16″	8	0.33″	0.49″	1.15″	4,700	3363T92	2.40	2.04
3/8″	10	0.40″	0.60″	1.30″	6,600	3363T93	2.71	2.30
1/2″	13	0.52″	0.81″	1.56″	11,300	3363T95	4.70	3.99
Poly-Coated Finish								
1/4″	7	0.31″	0.46″	0.94″	3,150	3412T72	3.51	2.98
3/8″	10	0.41″	0.57″	1.36″	6,600	3412T74	5.44	4.61
1/2″	13	0.53″	0.75″	1.70″	11,300	3412T76	6.79	5.76
Cold-Galvanized Finish								
1/4″	7	0.27″	0.48″	1.24″	3,150	34245T4	4.08	3.62
5/16″	8	0.33″	0.48″	1.00″	4,700	34245T5	4.88	4.33
3/8″	10	0.39″	0.55″	1.37″	6,600	34245T6	5.15	4.53
1/2″	13	0.51″	0.75″	1.78″	11,300	34245T7	7.29	6.47

High Strength (Grade 40)

Also known as binding chain, Grade 43 chain, and System 4 chain. This chain is approximately 50% stronger than our medium strength (Grade 30) chain. Use for load binding, tie downs, demolition, and towing. Chain is made of low-carbon steel and is not heat treated. We offer 5-, 10-, 25-, 50-, and 100-ft. lengths, as well as any length you may need.

Hot-galvanized finish provides extra corrosion resistance. *Poly-coated finish* is blue.

Trade Size Inch	mm	Diameter	Inside Link Size Wd.	Lg.	Work Load Limit, lbs.		Plain Finish Per Foot 1-49	50-Up	Zinc-Plated Finish Per Foot 1-49	50-Up
1/4″	7	0.28″	0.50″	1.02″	2,600	3588T14	$1.34	$1.15	3588T34	$1.54	$1.28
5/16″	8	0.33″	0.49″	1.15″	3,900	3588T15	1.51	1.32	3588T35	1.72	1.48
3/8″	10	0.40″	0.60″	1.30″	5,400	3588T16	1.72	1.50	3588T36	1.91	1.64
1/2″	13	0.52″	0.81″	1.56″	9,200	3588T18	3.09	2.69	3588T37	3.33	2.86
5/8″	16	0.63″	0.82″	2.12″	13,000	3588T49	7.48	6.51			
3/4″	20	0.78″	1.02″	2.60″	20,200	3588T51	11.79	10.16			
							Hot-Galvanized Finish		Poly-Coated Finish	
1/4″	7	0.28″	0.45″	1.20″	2,600	3588T22	$1.79	$1.49	3402T41	$3.22	$2.76
5/16″	8	0.33″	0.47″	1.27″	3,900	3588T23	2.04	1.75	3402T42	3.94	3.38
3/8″	10	0.40″	0.60″	1.30″	5,400	3588T24	2.43	2.04			
1/2″	13	0.52″	0.75″	1.70″	9,200	3588T26	4.19	3.60	3402T45	7.67	6.57

Medium Strength (Grade 30)

Also known as proof coil chain. Excellent for applications that don't require the greater strengths of our high strength (Grade 40) and maximum strength (Grade 70) chain. Use for tailgates, towings, tie downs, and logging chain, as well as pipe line hangers and guardrail chain. Chain is made of low-carbon steel and is not heat treated. We offer 5-, 10-, 25-, 50-, and 100-ft. lengths, as well as any length you may need.

Short-link chain has shorter links making it more flexible than standard-link chain. *Hot-galvanized* and *cold-galvanized finishes* provide extra corrosion resistance; *cold-galvanized finish* meets ASTM B695 and MIL-C-81562A specifications. *Poly-coated finish* is green.

Standard Link

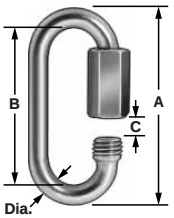
Short Link

Trade Size Inch	mm	Diameter	Inside Link Size Wd.	Lg.	Work Load Limit, lbs.		Plain Finish Per Foot 1-49	50-Up	Zinc-Plated Finish Per Foot 1-49	50-Up
Standard-Link Chain										
1/8″	4	0.16″	0.27″	0.90″	400	3592T12	$0.50	$0.45	3592T13	$0.57	$0.51
3/16″	5	0.21″	0.40″	0.95″	800	3592T14	.68	.60	3592T31	.73	.64
1/4″	7	0.28″	0.50″	1.02″	1,300	3592T15	.93	.81	3592T32	1.03	.89
5/16″	8	0.33″	0.49″	1.15″	1,900	3592T16	1.33	1.15	3592T33	1.46	1.27
3/8″	10	0.40″	0.60″	1.30″	2,650	3592T17	1.81	1.58	3592T34	1.91	1.66
1/2″	13	0.52″	0.81″	1.56″	4,500	3592T19	3.38	2.93	3592T36	3.68	3.20
5/8″	16	0.63″	1.00″	1.87″	6,900	3592T22	5.45	4.74			
3/4″	20	0.79″	1.13″	2.13″	10,600	3592T23	12.98	11.28			
							Hot-Galvanized Finish		Poly-Coated Finish	
1/8″	4	0.16″	0.27″	0.90″	400	3592T18	$0.71	$0.65	3411T51★	$0.98	$0.88
3/16″	5	0.21″	0.40″	0.95″	800	3592T44	.92	.80	3411T71	1.18	1.02
1/4″	7	0.28″	0.50″	1.02″	1,300	3592T45	1.31	1.14	3411T72	1.76	1.52
5/16″	8	0.34″	0.49″	1.15″	1,900	3592T46	1.81	1.57	3411T73	2.45	2.11
3/8″	10	0.40″	0.60″	1.30″	2,650	3592T47	2.41	2.08	3411T74	3.48	3.00
1/2″	13	0.52″	0.81″	1.56″	4,500	3592T49	4.66	4.02	3411T75	5.64	4.88
							Cold-Galvanized Finish			
3/16″	5	0.22″	0.40″	0.95″	800	3551T41	$1.38	$1.22			
1/4″	7	0.27″	0.48″	1.24″	1,300	3551T42	1.90	1.69			
5/16″	8	0.33″	0.48″	1.29″	1,900	3551T43	2.70	2.41			
3/8″	10	0.39″	0.55″	1.38″	2,650	3551T44	3.44	3.07			
Short-Link Chain							Plain Finish			
3/16″	5	0.22″	0.37″	0.78″	800	3575T11	$1.04	$0.94			
1/4″	7	0.28″	0.43″	0.87″	1,300	3575T22	1.55	1.39			
5/16″	8	0.34″	0.50″	1.00″	1,900	3575T23	2.28	2.04			
3/8″	10	0.41″	0.62″	1.09″	2,650	3575T24	3.34	2.99			

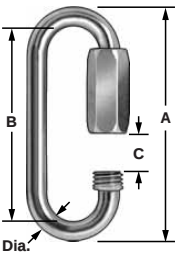
★ Work load limit is 375 lbs.

Warning! *Never exceed work load limits; never use for overhead lifting.*

Threaded Connectors



Oval with Standard Opening



Oval with Large Opening

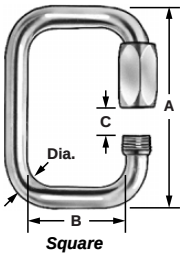
Also known as quick links, threaded connectors offer a quick and easy way to attach end fittings. To close, simply screw the nut onto the threaded end. Connectors are reusable. Not for lifting.

Oval—Use as connecting links. Good for securing a broken chain by connecting the separated links.
Square—Ideal for use with webbing and strapping.
Pear—Use with thimbles, bulky fittings, and combination chain and rope connections.
Triangle—Great for three-sided connnections.

Oval

Dia.	(A)	(B)	(C)	Pkg. Qty.	Zinc-Plated Steel: Work Load Limit, lbs.		Zinc-Plated Steel: Each Partial Pkg.	Zinc-Plated Steel: Each Full Pkg.	Brass: Work Load Limit, lbs.		Brass: Each Partial Pkg.	Brass: Each Full Pkg.	Type 316 Stainless Steel: Work Load Limit, lbs.		Type 316 Stainless Steel: Each Partial Pkg.	Type 316 Stainless Steel: Each Full Pkg.
Oval with Standard Opening																
1 1/8"	1 3/8"	1 1/8"	3/16"	50	220	8947T14	$0.70	$0.62	198	8947T96	$2.22	$2.03	120	8947T24	$2.33	$2.04
5/32"	1 9/16"	1 1/4"	7/32"	50	440	8947T11	.71	.64	350	8947T92	2.71	2.48	175	8947T12	2.48	2.17
3/16"	2"	1 1/2"	1/4"	50	660	8947T15	.80	.72	550	8947T93	3.11	2.85	380	8947T25	3.06	2.68
1/4"	2 1/4"	1 3/4"	9/32"	20	880	8947T16	.93	.84	771	8947T94	4.04	3.70	575	8947T26	3.99	3.49
5/16"	2 15/16"	2 5/8"	3/8"	20	1760	8947T17	1.44	1.30	1435	8947T95	6.40	5.91	1395	8947T27	5.54	4.85
3/8"	3 3/16"	2 7/16"	1/2"	50	2200	8947T18	2.02	1.82					1585	8947T28	8.63	7.50
1/2"	4 3/16"	3 3/16"	9/16"	20	3250	8947T23	3.68	3.30					2750	8947T29	13.18	11.53
9/16"	4 3/4"	3 5/8"	11/16"	20	3600	8947T31	7.73	6.85					7715	8947T82	33.54	29.34
5/8"	5 1/2"	4 1/4"	3/4"	10	4000	8947T32	12.70	11.26					9900	8947T83	53.21	46.55
Oval with Large Opening																
1 1/8"	1 13/16"	1 9/16"	3/8"	50	200	3711T21	1.87	1.72	155	3711T61	3.21	2.98	440	3711T32	4.27	3.88
3/16"	2 7/16"	2 1/16"	1/2"	50	550	3711T22	2.31	2.13	330	3711T62	4.35	4.04	880	3711T33	5.85	5.32
1/4"	2 3/4"	2 5/16"	9/16"	20	770	3711T23	2.71	2.49	550	3711T63	5.67	5.25	1280	3711T34	7.52	6.85
5/16"	3 7/16"	2 13/16"	11/16"	20	1430	3711T24	3.64	3.37	1212	3711T64	9.84	9.13	2160	3711T35	13.16	11.98
3/8"	3 3/4"	3"	3/4"	20	1760	3711T25	4.52	4.15					2755	3711T36	15.55	14.17
1/2"	4 7/8"	3 15/16"	15/16"	10	2755	3711T26	7.45	6.87					4850	3711T37	29.61	26.92
9/16"	5 9/16"	4 1/2"	1 1/16"	10	4410	3711T27	10.57	9.77					6835	3711T38	45.68	41.52
5/8"	6 5/16"	5 1/16"	1 1/8"	10	5510	3711T28	16.24	14.72					8820	3711T39	68.05	61.86
11/16"	6 15/16"	5 1/2"	1 1/4"	5	6615	3711T29	26.53	24.40								
25/32"	7 13/16"	6 1/4"	1 3/8"	5	7935	3711T31	37.90	34.81								

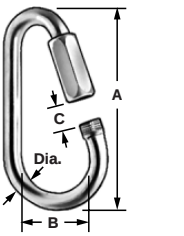
Square



Square

Dia.	(A)	(B)	(C)	Zinc-Plated Steel: Work Load Limit, lbs.	Zinc-Plated Steel: Pkg. Qty.		Zinc-Plated Steel: Each Partial Pkg.	Zinc-Plated Steel: Each Full Pkg.	Type 316 Stainless Steel: Work Load Limit, lbs.	Type 316 Stainless Steel: Pkg. Qty.		Type 316 Stainless Steel: Each Partial Pkg.	Type 316 Stainless Steel: Each Full Pkg.
7/64"	1 5/32"	11/16"	5/32"	85	20	33785T41	$2.67	$2.24	240	10	33785T61	$5.23	$4.39
1/8"	1 3/8"	7/8"	3/16"	155	20	33785T42	2.71	2.27	330	10	33785T62	5.29	4.44
5/32"	1 1/2"	1"	7/32"	220	20	33785T43	2.79	2.35	440	10	33785T63	5.74	4.82
3/16"	1 7/8"	1 1/8"	1/4"	330	20	33785T44	2.91	2.44	715	10	33785T64	6.18	5.19
1/4"	2 5/32"	1 1/4"	9/32"	550	20	33785T45	3.27	2.75	990	10	33785T65	8.27	6.94
9/32"	2 1/2"	1 5/16"	11/32"	880	20	33785T46	3.84	3.22	1375	10	33785T66	10.38	8.71
5/16"	2 13/16"	1 7/16"	3/8"	1210	10	33785T47	4.46	3.75	1695	10	33785T67	14.28	11.99
3/8"	3 1/16"	1 9/16"	7/16"	1540	10	33785T48	5.36	4.50	2160	5	33785T68	17.06	14.32
7/16"	3 1/2"	1 11/16"	1/2"	1985	10	33785T49	6.36	5.34	2755	5	33785T69	21.53	18.08
1/2"	4"	1 15/16"	5/8"	2425	10	33785T51	8.77	7.37	3860	5	33785T71	30.11	25.29
9/16"	4 9/16"	2 1/4"	11/16"	3970	10	33785T52	13.23	11.13	5400	5	33785T72	51.96	43.65
5/8"	5 5/16"	2 1/2"	3/4"	4850	10	33785T53	19.09	16.03	6945	5	33785T73	77.30	64.93

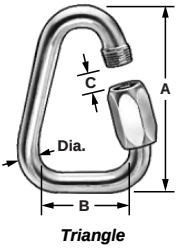
Pear



Pear

Dia.	(A)	(B)	(C)	Zinc-Plated Steel: Work Load Limit, lbs.	Zinc-Plated Steel: Pkg. Qty.		Zinc-Plated Steel: Each Partial Pkg.	Zinc-Plated Steel: Each Full Pkg.	Type 316 Stainless Steel: Work Load Limit, lbs.	Type 316 Stainless Steel: Pkg. Qty.		Type 316 Stainless Steel: Each Partial Pkg.	Type 316 Stainless Steel: Each Full Pkg.
1/8"	2 1/16"	13/16"	3/8"	125	50	3712T21	$2.58	$2.37	285	50	3712T31	$4.70	$4.28
3/16"	2 3/4"	1 1/16"	1/2"	265	50	3712T22	3.07	2.82	595	50	3712T32	6.41	5.84
1/4"	3 3/16"	1 3/16"	9/16"	440	20	3712T23	3.70	3.41	880	20	3712T33	8.52	7.74
5/16"	3 15/16"	1 7/16"	11/16"	1058	20	3712T24	4.80	4.41	1455	20	3712T34	15.59	14.17
3/8"	4 1/4"	1 9/16"	3/4"	1320	20	3712T25	5.66	5.22	1850	20	3712T35	18.07	16.42
1/2"	5 9/16"	2 1/16"	15/16"	1940	10	3712T26	10.10	9.29	3305	10	3712T36	31.89	28.99
9/16"	6 3/16"	2 1/4"	1 1/16"	3175	10	3712T27	14.32	13.16	4630	10	3712T37	51.28	46.61
5/8"	6 15/16"	2 1/2"	1 1/8"	4410	10	3712T28	20.12	18.49	5950	10	3712T38	77.05	69.54

Triangle

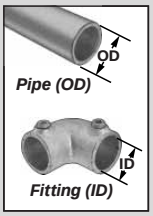


Triangle

Dia.	(A)	(B)	(C)	Zinc-Plated Steel: Work Load Limit, lbs.	Zinc-Plated Steel: Pkg. Qty.		Zinc-Plated Steel: Each Partial Pkg.	Zinc-Plated Steel: Each Full Pkg.	Type 316 Stainless Steel: Work Load Limit, lbs.	Type 316 Stainless Steel: Pkg. Qty.		Type 316 Stainless Steel: Each Partial Pkg.	Type 316 Stainless Steel: Each Full Pkg.
1/8"	1 7/16"	15/16"	3/16"	155	50	3709T21	$2.19	$1.95	330	50	3709T31	$4.47	$3.80
3/16"	1 7/8"	1 3/16"	1/4"	330	50	3709T22	2.68	2.23	715	50	3709T32	5.88	5.02
1/4"	2 3/16"	1 3/8"	9/32"	550	20	3709T23	3.01	2.64	990	20	3709T33	7.79	6.57
5/16"	2 7/8"	1 9/16"	3/8"	1210	20	3709T24	4.03	3.52	1695	20	3709T34	12.98	11.20
3/8"	3 1/16"	1 11/16"	7/16"	1540	20	3709T25	4.79	4.20	2160	20	3709T35	15.14	13.07
1/2"	4 1/8"	2"	19/32"	2425	10	3709T26	8.52	7.34	3860	10	3709T36	28.81	24.50
9/16"	4 13/16"	2 1/4"	21/32"	3970	10	3709T27	12.26	10.39	5400	10	3709T37	44.97	38.36
5/8"	5 7/16"	2 3/8"	3/4"	4850	10	3709T28	16.68	14.45	6945	10	3709T38	66.81	57.05

Warning! *Never exceed work load limits.*

Please Read Before Ordering: Use the following steps to help select the proper pipe and fitting size for your application:



(1) Since all of the fittings fit over pipe, you need to know either the outside diameter (OD) of your pipe or the inside diameter (ID) of your fitting. Use a ruler and the illustrations at left to help determine correct pipe OD and fitting ID measurements.

(2) Round the measurements you've taken down to the nearest pipe OD/fitting ID listed in the chart above. For example, if you measured the pipe OD or fitting ID to be 1⅜", round that measurement down to 1⁵⁄₁₆", which is the nearest pipe OD/fitting ID listed in the chart. Your pipe OD or fitting ID size would then be 1⁵⁄₁₆". *Note:* Since pipe OD and the compatible fitting ID are so close in size, they are listed in the chart as the same size to help make it easier for you to match up pipe and fittings.

Pipe OD/Fitting ID	1"	1⁵⁄₁₆"	1⅝"	1⅞"	2⅜"
Pipe Size	¾"	1"	1¼"	1½"	2"

(3) For your convenience, we have also listed the corresponding pipe size. Keep in mind, however, that the term pipe size is not an actual measurement—it's an accepted industry designation.

Galvanized Iron and Aluminum Slip-On Structural Fittings ***(Continued from previous pg.)*** CAD





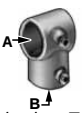
Fitting ID/ Pipe OD	Fits Pipe Size	Crossovers	Each	Open Crossovers	Each	Add-On Crossovers Iron	Each	Add-On Crossovers Aluminum	Each	4-Outlet Crossovers	Each	2-Outlet Crosses w/Through Hole	Each	4-Outlet Crosses w/Through Hole	Each
Galvanized Iron															
1"	¾"	4936T189	$5.68	4936T191	$4.41							4936T181	$6.58	4936T219	$11.92
1⁵⁄₁₆"	1"	4936T47	6.26	4936T24	4.81							4936T37	7.51	4936T221	13.99
1⅝"	1¼"	4936T48	8.79	4936T25	6.58	4936T216	$13.91			4936T149•	$12.62	4936T38	9.10	4936T225	19.97
1⅞"	1½"	4936T49	10.32	4936T26	8.82	4936T217	15.96					4936T39	11.55	4936T226	23.16
2⅜"	2"	4936T89	16.55	4936T78	15.02							4936T85	18.68	4936T227	33.57
Aluminum															
1"	¾"	4698T42	6.82							4698T63	8.44	4698T19	6.89	4698T142	15.12
1⁵⁄₁₆"	1"	4698T43	8.96			4698T124	17.59			4698T64	12.02	4698T21	8.71	4698T143	15.75
1⅝"	1¼"	4698T44	13.04			4698T125	18.76			4698T65	15.98	4698T22	9.45	4698T144	18.41
1⅞"	1½"	4698T45	15.27			4698T126	23.14			4698T66	17.60	4698T23	11.90	4698T145	22.88
2⅜"	2"									4698T226	24.81	4698T194	18.29		

• Has 3 outlets.



Fitting ID/ Pipe OD	Fits Pipe Size	Adjustable 180° Outlets w/Through Hole	Each	Straight Through Hole Couplings Lg.	Each	Panel Connectors w/Through Hole (C)	Each	Tees with Pipe End■	Each
Galvanized Iron									
1"	¾"	4936T183	$18.34	3"	4936T193 $5.57	⅜"	4936T184 $4.40		
1⁵⁄₁₆"	1"	4936T57	17.62	3½"	4936T14 5.76	⅜"	4936T115 4.40	4936T236	$8.44
1⅝"	1¼"	4936T58	20.65	4"	4936T15 7.63	⅜"	4936T116 5.44	4936T237	11.76
1⅞"	1½"	4936T59	23.16	4"	4936T16 8.71	⅜"	4936T117 5.60	4936T238	13.35
2⅜"	2"	4936T119	43.77	4⅞"	4936T75 12.09	⅜"	4936T118 10.35		
Aluminum									
1"	¾"	4698T86	15.02	2½"	4698T214 5.18	¼"	4698T151 5.07	4698T159	9.12
1⅝"	1"	4698T87	18.24	3½"	4698T217★ 6.14	¼"	4698T152 5.84	4698T167	9.49
1⅝"	1¼"	4698T88	26.98	5¼"	4698T11 12.61	7⁄16"	4698T153 8.71	4698T168	12.65
1⅞"	1½"	4698T89	32.76	5⁹⁄₁₆"	4698T12 14.17	7⁄16"	4698T154 10.22	4698T169	14.51
2⅜"	2"			4"	4698T188 13.88			4698T175	22.22

■ Tees are combined with a pipe end (which has no set screw) that connects to another same-size tee, elbow, or crossover fitting to allow 360° pivoting for adjoining rail or pipe. ★ Set screw size is ⅜"-16×7⁄16".



Fitting ID/ Pipe OD (A)	(B)	Fits Pipe Size (A)	(B)	Reducing Tees	Each	Reducing Crossovers	Each
Galvanized Iron							
1⅝"	1"	1"	¾"	4936T721	$6.30	4936T863	$7.06
1⅝"	1⁵⁄₁₆"	1¼"	1"	4936T727	8.65	4936T869	9.65
1⅞"	1⅝"	1½"	1¼"	4936T734	8.97	4936T878	11.30
2⅜"	1⅞"	2"	1½"	4936T738	15.23	4936T882	19.05

PIPE PLUGS

Fits Pipe OD	Fits Pipe Size	Polypropylene	Each	Iron	Each	Aluminum	Each
1"	¾"	4936T196	$0.91	4936T197	$0.81	4698T171	$1.48
1⁵⁄₁₆"	1"	4936T141	1.09	4936T137	1.43	4698T172	1.84
1⅝"	1¼"	4936T142	1.21	4936T138	2.27	4698T173	2.02
1⅞"	1½"	4936T143	1.22	4936T139	2.74	4698T174	2.68
2⅜"	2"	4936T144	1.24	4936T411	4.41	4698T191	2.98

Collars

Fitting ID/ Pipe OD	Fits Pipe Size	Each
Galvanized Iron		
1"	¾"	4936T195 $3.12
1⁵⁄₁₆"	1"	4936T134 3.66
1⅝"	1¼"	4936T135 3.86
1⅞"	1½"	4936T136 4.37

SET SCREWS

For Fitting ID	For Iron Fittings♦ Screw Size	Pkg. Qty.	Per Pkg.	For Aluminum Fittings Screw Size	Pkg. Qty.	Per Pkg.
1"	¼"×½"	25	4936T918 $10.21	5⁄16"-18×5⁄16"	100	90289A575 $11.76
1⅝"	¼"×½"	25	4936T918 10.21	5⁄16"-18×5⁄16"	100	90289A575 11.76
1⅝"	⅜"×⅝"	25	4936T919 13.28	⅜"-16 ×⅜"	50	90289A617 6.43
1⅞"	⅜"×⅝"	25	4936T919 13.28	⅜"-16 ×⅜"	50	90289A617 6.43
2⅜"	⅜"×⅝"	25	4936T919 13.28	⅜"-16 ×7⁄16"	50	90289A618 13.80

♦ British Standard Pipe Parallel thread (BSPP).

(Continued on following page)

Appendix A

Quality Assurance Project Plan Addendum

Final
Addendum to the Quality Assurance Project Plan
for the
RI Investigative Derived Waste (IDW) Water Sampling and Disposal
at the
Niagara Falls Storage Site

Niagara Falls FUSRAP Site
Lewiston, New York

Prepared for:
U.S. Army Corps of Engineers
Buffalo District

Prepared by:
Science Applications International Corporation
4900 Blazer Parkway
Dublin, Ohio 43017

FS Contract: DACW49-00-C-0020
Task Contract: W912P4-04-D-0001

October 8, 2004

INTRODUCTION

The September 1999 Final Draft Quality Assurance Project Plan (QAPP) for the Phase I Remedial Investigation (RI) at the Niagara Falls Storage Site (NFSS) (MAXIM 1999) in addition to the August 2000 Addendum (MAXIM 2000) to the Quality Assurance Project Plan were used as the basis for preparation of this Addendum addressing the RI Investigative Derived Waste (IDW) Water Sampling and Disposal task. Science Applications International Corporation (SAIC) will be completing this task for the United States Army Corps of Engineers (USACE) under a separate HTRW Architect-Engineer (A-E) services contract. The primary purpose of this Addendum is to demonstrate that the Minimal Detectable Activity (MDA) given in Table 3-10A of Maxim's August 2002 QAPP Addendum complies with limits set fourth in 6 NYCRR Part 380 as required by USACE.

1.0 PROJECT DESCRIPTION

A detailed project description can be found in Section 1.0 of the associated Work Plan for this task.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

SAIC will be performing the RI IDW Water Sampling and Disposal task at NFSS on behalf of the Buffalo District, USACE. The key SAIC personnel for this project and their contact information are given in table 2.1. This information, as well as an organizational chart and key personnel responsibilities, can be found in the February 2002 Quality Control Plan (QCP) and the associated September 2004 QCP Addendum for this task.

Table 2.1 Key SAIC Personnel and Contact Information for the RI Investigative Derived Waste (IDW) Water Sampling and Disposal at the Niagara Falls Storage Site in Lewiston, New York

Name	Position/Role	Phone	Fax	Organization
Jeff Dick	Project Manager	(330) 405-5807	(330) 405-9811	SAIC
Deb Engelgau	IDW Task Manager	(614) 791-3377	(614) 793-7620	SAIC
Dave Lyerla	Radiation Safety Officer	(314) 770-3058	(314) 344-4349	SAIC
Glen Cowart	QA/QC Officer	(865) 481-4630	(865) 482-7257	SAIC
Beau Williams	Field Task Manager/ Field Health and Safety Officer	(330) 405-5817	(330) 405-9811	SAIC
Dave Kulikowski	Data Manager	(614) 791-3375	(614) 793-7620	SAIC
George Butterworth	Senior Technical Advisor	(931) 840-0253	(931) 840-0253 (same as voice)	SAIC

3.0 DATA QUALITY OBJECTIVES FOR MEASUREMENT OF DATA

Table 3-10A is a revised version of the table contained in Maxim's August 2002 QAPP Addendum. This table has been updated to illustrate how the 6 NYCRR 380 discharge requirements for wastewater compare to the previously used MDA requirements. For this task the reporting limits must be below 10 percent of the 6 NYCRR Part 380 discharge requirements for the IDW liquids to be approved for disposal. The table illustrates that using the MDA requirements will in fact keep the effluent concentration below 10 percent of the 6 NYCRR Part 380 requirements for all constituents with the exception of Pa-231, Ac-227, and Am-241. The Am-241 MDA is less than the effluent limit

and very close to the 10 percent requirement of 20 pCi/L. The laboratory does not have alternative methods (i.e. alpha-spec) for achieving the effluent requirements for Pa-231 and Ac-227. NYSDEC is aware of these limitations.

Table 3-10A (Revised) Radiological Testing Minimum Detectable Activities (MDA's) for Reporting

Parameter	Method (Water)[1]	MDA (soil) pCi/g	MDA (water) pCi/L	6 NYCRR Part 380 Requirements (monthly average concentration)[1] pCi/L (µCi/ml)[2]	Is MDA < 10% of 6 NYCRR Part 380
Isotopic Thorium					
Th-228 (Alpha Spec)	HASL 300	1.0	0.5	2,000 (2 x $10^{-6)}$	Yes
Th-230 (Alpha Spec)	HASL 300	1.0	0.5	1,000 (1 x 10^{-6})	Yes
Th-232 (Alpha Spec)	HASL 300	1.0	0.5	300 (3 x 10^{-7})	Yes
Isotopic Uranium					
U-233/234 (Alpha Spec)	HASL 300	1.0	0.5	3,000 (3 x 10^{-6})	Yes
U-235 (Alpha Spec)	HASL 300	1.0	0.5	3,000 (3 x 10^{-6})	Yes
U-238 (Alpha Spec)	HASL 300	1.0	0.5	3,000 (3 x 10^{-6})	Yes
Radium-226	903.1 Radon Emanation	0.1	1.0	600 (6 x 10^{-7})	Yes
Radium-228	904 Gas Flow	0.2	1.0	600 (6 x 10^{-7})	Yes
Gross Alpha and Nonvolatile Beta					
Gross Alpha	900, Gas Flow	4.0	2.0	-	-
Gross Beta	900, Gas Flow	10.0	2.0	-	-
Isotopic-Pu (Alpha Spec)					
Pu-238 (Alpha Spec)	HASL 300	1.0	0.5	200 (2 x 10^{-7})	Yes
Pu-239/240 (Alpha Spec)	HASL 300	1.0	0.5	200 (2 x 10^{-7})	Yes
Sr-90	EPA 905.0	2.0	1.0	5,000 (5 x 10^{-6})	Yes
Gamma Spectrometry					
U-238 (Gamma Spec)	HASL 300	1.5	225.0	N/A, Alpha Spec Results will be used	
Ra-226 (Gamma Spec)	HASL 300	0.1	N/A	N/A, Alpha Spec Results will be used	
Ra-228 (Gamma Spec)	HASL 300	0.2	25.0	N/A, Alpha Spec Results will be used	
Th-228 (Gamma Spec)	HASL 300	0.1	10.0	N/A, Alpha Spec Results will be used	
U-235 (Gamma Spec)	HASL 300	0.5	30.0	N/A, Alpha Spec Results will be used	
Pa-231 (Gamma Spec)	HASL 300	1.0	200.0	60 (6 x 10^{-8})	No
Ac-227 (Gamma Spec)	HASL 300	0.5	50.0	50 (5 x 10^{-8})	No
Co-60 (Gamma Spec)	HASL 300	0.1	5.0	30,000 (3 x 10^{-5})	Yes
Cs-137 (Gamma Spec)	HASL 300	0.1	5.0	10,000 (1 x 10^{-5})	Yes
Am-241 (Gamma Spec)	HASL 300	0.1	30.0	200 (2 x 10^{-7})	No
Parameter (Water Quality)	**Method**	**MDL (soil)**	**MDL (water)**		
Total Suspended Solids (TSS)	160.2	N/A	5.0 mg/L	N/A	N/A

1. 6 NYCRR Part 380 is only relevant to the IDW liquids that will be transported to the wastewater disposal facility and does not pertain to the IDW solids that will be transported to Waste Control Specialists (WCS).
2. Example calculation showing conversion from µCi/ml to pCi/L.

$$\frac{2 \times 10^{-7}\,\mu Ci}{1 ml} \times \frac{1000 ml}{1 L} \times \frac{10^{6} pCi}{\mu Ci} = 200\ pCi/L$$

4.0 SAMPLING PROCEDURES

Solid and liquid samples will be taken from each IDW tank by the methods described below. These samples will be tested for the parameters found in Table 4.1 and 4.2.

4.1 SOLID SAMPLE COLLECTION

It will be necessary to collect a total of eight (8) sediment soil samples, one from each tank, which will be comprised of five (5) aliquot samples from each tank. Sample composition procedures will follow the field technical procedures in Maxim's approved Work Plan(s). Prior to vegetation removal activities the five (5) aliquot sediment samples will be collected from each tank and mixed in a stainless steel bowl, or similar, for each IDW tank composite sample. The sample will be analyzed for the parameters listed in Table 4.2. The sediment samples will be collected using appropriate sampling equipment that will allow collection of a good cross section of the sediment such as a drum thief, bucket auger, and acetate tube. Other equipment that may be utilized depending on the quantity of vegetation and the depth of sediment and water in each tank include a ponar dredge sampler, stainless steel spoon or trowel attached to an extension rod, or other similar sample method. Efforts will be made to collect equal quantities for the composite sample during collection. If the sediment volume in a tank is insufficient to collect a sample, sediments that collect in the 10-micron filter will be analyzed according to the priority list detailed in Table 4.2. Sample collection equipment, including stainless steel bowls, will be decontaminated prior to use and between sample collection in each tank. The decontamination water generated during the collection of solid samples will be returned to its associated IDW tank. The following details the use of the sampling equipment.

The *drum thief* is a sampling device which has a hollow tube attached to a tee-handle and is generally used to collect soil samples from drums. The sampler will be pressed into the sediment and if necessary, twisted to sheer off the leading edge of the sample. The collected sample will then be placed into the stainless steel bowl for composite. This device is useful when sediment consistency and vegetation are relatively dense.

The *bucket hand auger* consists of an open top cylinder with offset cutting flights and is attached to a tee-handle. Much like the drum thief, the hand auger is pressed or twisted into the sediment and placed in the stainless steel bowl. The bucket hand auger is useful when sediment consistency and vegetation are relatively dense.

The *acetate tube* is a hollow plastic tube that is inserted into the sediment and plugged at the opposite end trapping sediment. The sediment can then be scooped out of the end of the tube and into the stainless steel bowl. The plug can be fitted with a compression fitting which would allow a peristaltic pump to remove the water above the sediment in the event the sediment can not be scooped out without the water above it entering the stainless steel bowl.

The *ponar dredge sampler*, attached to a rope, has butterfly valves on its top surface to permit water to pass through as the open sampler descends to the sediment layer. The sampler will be lowered into opening of the tank and into the sediment layer of the tank. Once in a desired location in the tank, the ponar sampler will be triggered or pulled closed trapping the sediment and closing the butterfly valves which minimize water movement and flow through as the sampler is pulled to the surface. The sampler will then be removed from the tank, opened, and the sediments placed in a stainless steel bowl. This sampler is less effective when plant material is dense.

The *stainless steel spoon or trowel attached to an extension rod* entails attaching a spoon or trowel to an extension rod or stick with nylon cable ties or similar. The spoon or trowel is then used to scoop

the sediment out of the tank and into a stainless steel bowl. This is useful when water levels are relatively close to the sediment layer and when vegetation is moderately dense.

Samples will be packaged following approved Work Plan procedures. Sample numbers will be recorded on the chain-of-custody. Field logbooks will follow Maxim's approved Work Plan(s).

Quality Control (QC) samples will not be collected for this task since the contract lab (GEL) has been used for RI sampling conducted from 1999 to the present, and sufficient quality control has been established from previous RI quality control sampling.

4.2 LIQUID SAMPLE COLLECTION

After sediment samples have been collected, the vegetation has been removed, and Tank 7 has been cleaned, agitation of the sediment and water in the remaining seven tanks will commence as the first step in collecting representative water samples. The tanks will be sampled in the following order: Tank 4, Tank 1, Tank 2, Tank 5, Tank 6, Tank 8, and Tank 3. A minimum of two 2" submersible pumps will be required for this phase of work. An additional 3/4" submersible pump with the capability of removing the water to within 1/8" of the tank floor will be needed for final dewatering and pressure washing of Tank 7. All pumps, nozzles, and hoses used for this work will be supplied by USACE onsite. The contents of each tank should be agitated until the sediment material in the tank is in suspension. Mixing will be accomplished by placing a submersible pump with a short section of discharge hose connected to the pump discharge port in each tank and operating the pump for a period of time. Field observation will be used to determine the optimum mixing method using the submersible pump. A metal rod or wood board may be used to guide the discharge hose along the bottom of the tank to maximize mixing the tank contents. During mixing of the tank contents, any remaining vegetative material may be removed using a pool skimmer screen.

After the tank contents are mixed a dedicated 10-micron absolute-rated micro-fiber filter bag will be attached to the pump discharge hose. Filtered water effluent from the filter bag will then be directed into a sample collection container. The filter bag will be removed from the hose and retained for use during the bench scale filtration test.

The submersible pump and discharge hose will be decontaminated between tanks and after the final tank using two (2) 55-gallon drums partially filled with water. After mixing the contents of an IDW tank the submersible pump will be removed from that tank and placed into the first drum containing 35 to 40 gallons of potable water from Building 429 or the fire hydrant. The submersible pump/discharge hose assembly will be operated to flush the sediment from the pump/hose assembly. The submersible pump/discharge hose assembly will then be removed from the first drum and placed into the second drum containing 35-40 gallons of deionized (DI) water. The pump will be operated to circulate water in the drum to rinse the pump/hose assembly. After all of the tanks have been sampled, the decontamination water in both drums will be pumped through a 10-micron filter bag into Tank 7.

In addition to the field-filtered samples discussed above, unfiltered samples will be collected from Tank 4 and analyzed for the parameters found in Table 4.1. The wastewater in Tank 4 will be agitated to resuspend the sediment. Unfiltered liquid samples will then be collected by dipping a sample container into the water or by the use of a peristaltic pump with dedicated tubing.

QC samples will not be collected for this task since the contract lab (GEL) has been used for RI sampling conducted from 1999 to the present, and sufficient quality control has been established from previous RI quality control sampling.

Table 4.1 IDW Bench Scale Testing Phase
Liquid-Analytical Methods and Containers

Location	Parameter	Analytical Method	Bottle Requirements
Tank 4 Unfiltered Liquid			
Tank 4	Gross Alpha and Nonvolatile Beta	900, Gas Flow	500 ml P,G[1] , HNO_3<2
Tank 4	Gamma Spectrometry	HASL 300, Gamma Spec	2,000 ml P,G[1], HNO_3<2
Tank 4	Isotopic Uranium	HASL 300, Alpha Spec	1,000 ml P,G[1], HNO_3<2
Tank 4	Isotopic Thorium	HASL 300, Alpha Spec	1,000 ml P,G[1], HNO_3<2
Tank 4	Radium-226	903.1 Radon Emanation	1,000 ml P,G[1], HNO_3<2
Tank 4	Radium-228	904 Gas Flow	1,000 ml P,G[1], HNO_3<2
Field Filtered Effluent (10 um)			
Tanks 1-6,8	Gross Alpha and Nonvolatile Beta	900, Gas Flow	7-500 ml P,G[1], HNO_3<2
Tanks 1-6,8	Gamma Spectrometry	HASL 300, Gamma Spec	7-2,000 ml P,G[1], HNO_3<2
Tanks 1-6,8	Isotopic Uranium	HASL 300, Alpha Spec	7-1,000 ml P,G[1], HNO_3<2
Tanks 1-6,8	Isotopic Thorium	HASL 300, Alpha Spec	7-1,000 ml P,G[1], HNO_3<2
Tanks 1-6,8	Radium-226	903.1 Radon Emanation	7-1,000 ml P,G[1], HNO_3<2
Tanks 1-6,8	Radium-228	904 Gas Flow	7-1,000 ml P,G[1], HNO_3<2
Tanks 1-6,8	Total Suspended Solids (TSS)	160.2	7-1,000 ml P,G[1], 4°C
Tank 3	Isotopic-Pu	HASL 300, Alpha Spec	1,000 ml P,G[1], HNO_3<2
Tank 3	Sr-90	905.0	1,000 ml P,G[1], HNO_3<2
Lab Filtered Effluent (0.45 um)			
Tanks 1-6,8	Gross Alpha and Nonvolatile Beta	900, Gas Flow	7-500 ml P,G[1]
Tanks 1-6,8	Gamma Spectrometry	HASL 300, Gamma Spec	7-2,000 ml P,G[1]
Tanks 1-6,8	Isotopic Uranium	HASL 300, Alpha Spec	7-1,000 ml P,G[1]
Tanks 1-6,8	Isotopic Thorium	HASL 300, Alpha Spec	7-1,000 ml P,G[1]
Tanks 1-6,8	Radium-226	903.1 Radon Emanation	7-1,000 ml P,G[1]
Tanks 1-6,8	Radium-228	904 Gas Flow	7-1,000 ml P,G[1]
Tank 3	Isotopic-Pu	HASL 300, Alpha Spec	1,000 ml P,G[1]
Tank 3	Sr-90	905.0	1,000 ml P,G[1]
Laboratory Spent 0.45 um Filter			
Tanks 1-6,8	Gamma Spectrometry	HASL 300, Gamma Spec	N/A
Tanks 1-6,8	Isotopic Uranium	HASL 300, Alpha Spec	N/A
Tanks 1-6,8	Isotopic Thorium	HASL 300, Alpha Spec	N/A
Tanks 1-6,8	Radium-226	903.1 Radon Emanation	N/A
Tanks 1-6,8	Radium-228	904 Gas Flow	N/A
Tank 3	Isotopic-Pu	HASL 300, Alpha Spec	N/A
Tank 3	Sr-90	905.0	N/A

1. P,G indicates that either a plastic or glass container can be used.

Table 4.2 IDW Bench Scale Testing Phase
Tank Solids-Analytical Methods and Containers

Location	Parameter	Analytical Method	Bottle Requirements[2]	Priority[3]	
				Tank 3	All Other Tanks
Tanks 1-8	EP Toxicity (TCLP)	All TCLP Parameters	8-8oz, Amber Glass, 4°C	6	4
Tanks 1-8	Corrosivity	9045C	8-4 oz, P,G[1], 4°C	6	4
Tanks 1-8	Ignitability	1010	8-4 oz, P,G[1], 4°C	6	4
Tanks 1-8	Reactivity (Sulfides and Cyanides)	9034- Sulfide 9012A- Cyanide	8-4 oz, P,G[1], 4°C	6	4
Tanks 1-8	Paint Filter Test	9095A	8-8 oz, P,G[1], 4°C	6	4
Tanks 1-8	Gamma Spectrometry	HASL 300, Gamma Spec	8-16oz, P,G[1]	5	3
Tanks 1-8	Isotopic Uranium	HASL 300, Alpha Spec		3	1
Tanks 1-8	Isotopic Thorium	HASL 300, Alpha Spec		4	2
Tanks 1-8	Radium-226	Included in Gamma Spec for Solids	n/a	N/A	N/A
Tanks 1-8	Radium-228	Included in Gamma Spec for Solids	n/a	N/A	N/A
Tank 3	Isotopic-Pu	HASL 300, Alpha Spec	1-4oz, P,G[1]	1	N/A
Tank 3	Sr-90	905.0		2	N/A

1. P,G indicates that either a plastic or glass container can be used.
2. GEL suggests using straight sided Nalgene bottles with wide mouths for solid samples that can be placed in plastic containers.
3. The priority number is the order in which analytical methods should be completed if there is not a sufficient amount of sediment either from direct sampling and/or from sediments collected on the filter to complete all of the analyses. Depending on the sample amount collected, field personnel will request analyses on the Chain of Custody forms in the order identified.

REFERENCES

MAXIM Technologies Inc. (MAXIM) 1999. Quality Assurance Project Plan Remedial Investigations at the Niagara Falls Storage Site, Draft Final. MAXIM, September, 1999.

MAXIM Technologies Inc. (MAXIM) 2000. Quality Assurance Project Plan Remedial Investigations at the Niagara Falls Storage Site, Addendum. MAXIM, August, 2000.

Appendix B

Health, Safety and Radiation Protection Plan Addendum

Final
Addendum to the Health, Safety, and Radiation Protection Plan
for the
RI Investigative Derived Waste (IDW) Water Sampling and Disposal
at the
Niagara Falls Storage Site

Niagara Falls FUSRAP Site
Lewiston, New York

Prepared for:
U.S. Army Corps of Engineers
Buffalo District

Prepared by:
Science Applications International Corporation
4900 Blazer Parkway
Dublin, Ohio 43017

FS Contract: DACW49-00-C-0020
Task Contract: W912P4-04-D-0001

October 8, 2004

Review Certification Sheet

for the
Site Safety and Health Plan Addendum and Radiation Protection Plan Addendum
for the
Remedial Investigation (RI) Investigative Derived Waste (IDW) Water Sampling and Disposal at the Niagara Falls Storage Site
Lewiston, New York

Prepared by:
Science Applications International Corporation
Dublin, Ohio

I, the undersigned have reviewed and submitted my comments on the Draft Site Safety and Health Plan Addendum and the Radiation Protection Plan Addendum. All comments have been resolved and the Final Document is ready for use.

Reviewer	Date
For SLD 	October 5, 2004
Steve Davis CIH, CSP	

INTRODUCTION

The September 1999 Final Draft Site Safety and Health Plan and Radiation Protection Plan as well as the August 2000 and May 2002 Addenda to this plan were used as the basis for preparation of this Addendum addressing the Remedial Investigation (RI) Investigative Derived Waste (IDW) Water Sampling and Disposal task. Science Applications International Corporation (SAIC) will be completing this task for the United States Army Corps of Engineers (USACE) under a separate HTRW Architect-Engineer (A-E) services contract. Only the sections of the May 2002 Addendum that required changes under this new task are included in this Addendum and are only effective for this specific task.

1.0 PROJECT DESCRIPTION

A detailed project description can be found in Section 1.0 of the associated Work Plan Addendum for this task.

2.0 AREAS OF STUDY

The activities addressed by this plan include the sampling and disposal of liquid and solid IDW found in eight temporary storage tanks at the Niagara Falls Storage Site (NFSS) in Lewiston, New York.

3.0 HAZARD IDENTIFICATION AND RISK ANALYSIS

3.1 PRELIMINARY EVALUATION

A preliminary evaluation of this task, the overall site characteristics, and hazards associated with this task was performed by the Field Task Manager/Field Health and Safety Officer during the preparation of this document. This preliminary evaluation has resulted in the identification of potentially hazardous conditions and will aid in the selection of appropriate employee protection methodologies and personal protective equipment (PPE). Evaluation of work site characteristics and hazards is an on-going process and will continue throughout the duration of the project.

The primary physical hazards during this project are hazards associated with movement of 1500 gallon IDW storage tanks using a skid steer loader, tipping of the IDW storage tanks, operation of sampling equipment, slip/trip/fall on uneven terrain, and electrical hazards associated with the use of electrical equipment in outdoor situations.

Chemical and radiological contamination may be encountered in the area of study during vegetation removal, sample collection, liquid filtration, and solid IDW placement in drums.

3.2 HAZARD IDENTIFICATION

Hazards or conditions that may pose health or safety threats are identified so site workers may be adequately protected. Emphasis is placed on identifying conditions that may cause death or serious harm and the protective measure implemented to avoid such hazards. All site workers must be diligent in identifying hazards in the work place and should bring them to the attention of supervisory personnel. All workers on-site have the authority to stop work if a potentially dangerous or unsafe condition exists.

Physical hazards known to be encountered in conducting field operations at this site are: unsure footing; trip, slip, and fall; extreme weather; and icy conditions due to the time of year these tasks will be conducted.

Table 3.1 and 3.2 list the health and safety hazards anticipated for this task and identify recommended controls to mitigate these hazards. Table 3.3 identifies potential exposures that may be present in addition to those listed in MAXIM's original SSHP.

Table 3.1 NFSS IDW Hazards Inventory

Yes	No	Hazard
X		Biological hazards
	X	Confined space entry
	X	Drowning
X		Electrical shock
	X	Excavation entry
X		Exposure to chemicals
X		Fire
	X	Unexploded ordnance
X		Heavy equipment
X		Noise
X		Radiation or radioactive contamination
X		Temperature extremes
X		Lifting
X		Falls
X		Exposure to flammables
X		Spills and Leaks
	X	Hazardous Energy (LO/TO)
X		Eye, Face, or Head Hazards (PPE)
	X	Respiratory Hazards
X		Sanitation
	X	Hot Work

Table 3.2 Activity Hazard Analysis

ACTIVITY: **IDW TANK SAMPLING, FILTERING, AND CLEANING** **ANALYZED BY:** **B. WILLIAMS**

PRINCIPAL STEPS	POTENTIAL SAFETY AND HEALTH HAZARDS	RECOMMENDED CONTROLS
1. Mobilization and Demobilization to/from the site	General safety hazards	Level D PPE. CPR and First Aid training for at least 1 on-site personnel. Coordination of on-site activities with USACE Buffalo district personnel and in accordance with Occupational Safety and Health Administration (OSHA) and USACE requirements.
	Uneven and slippery surfaces	Employees shall observe field conditions for potential uneven or slippery surfaces. Employees shall be reminded of the potential presence of these conditions during site-specific training and tailgate briefings. Snowy or icy conditions may require removal or melting through use of calcium chloride or similar.
	Vehicle accidents	Compliance with E&I EC&HS Procedure 110, Vehicle Operation. Seat belts required at all times. Obey traffic laws. Only licensed drivers. Routine vehicle inspections. No cell phone use while driving. Site activities coordinated with USACE Buffalo district personnel.
	Biological hazards (bees, mosquitoes, ticks, wasps, poison ivy)	PPE (boots, work clothes, taped pant legs as necessary). Insect repellant as necessary. Self inspection for ticks.
	Heavy Lifts	Compliance with E&I EC&HS Procedure 150, Manual Lifting. Lifts of over 50 pounds will be made with two or more personnel or with lifting equipment.

Table 3.2 Activity Hazard Analysis

ACTIVITY: **IDW TANK SAMPLING, FILTERING, AND CLEANING** **ANALYZED BY:** **B. WILLIAMS**

PRINCIPAL STEPS	POTENTIAL SAFETY AND HEALTH HAZARDS	RECOMMENDED CONTROLS
1. Mobilization and Demobilization to/from the site (continued)	Exposure to chemicals (see Table 3.3 Potential Exposure)	Level D PPE. Nitrile gloves for chemical/contaminant contact. Chemical containers labeled with identity and hazard. MSDSs on site for all chemicals in use. Site-specific training must address chemicals, hazards, and proper handling. Wash face and hands prior to taking anything by mouth.
	Noise	Hearing protection, as required when working near loud equipment or when personnel have to shout to be heard.
	Temperature extremes	Administrative controls such as taking breaks as needed in climate controlled locations, copious beverage intake in clean areas and after cleaning face and hands, dry clothes for wet work, etc. will be used. Outdoor work will not be performed in weather when the equivalent chill temperature (temperature combined with the effect of wind) is less than -25°F.
2. Vegetation removal	General Safety Hazards	Level D PPE. Site-specific training, Hazardous Waste Site Operator (HAZWOPER) 40-hour training, current refresher training. Radworker Trained. CPR and First Aid training for at least 1 on-site personnel. No confined spaces will be entered. Coordination of all on-site activities with USACE Buffalo district personnel and in accordance with OSHA and USACE requirements.

Table 3.2 Activity Hazard Analysis

ACTIVITY: **IDW TANK SAMPLING, FILTERING, AND CLEANING** **ANALYZED BY:** **B. WILLIAMS**

PRINCIPAL STEPS	POTENTIAL SAFETY AND HEALTH HAZARDS	RECOMMENDED CONTROLS
2. Vegetation removal (continued)	Uneven and slippery surfaces	Employees shall observe field conditions for potential uneven or slippery surfaces. Employees shall be reminded of the potential presence of these conditions during site-specific training and tailgate briefings. Plastic step stool or fiberglass ladder will be used to access tank. Inspect stool or ladder daily before use. Steps kept free of soil and similar. All legs on level ground surface and stable prior to ascending. Locking mechanisms locked prior to ascending. Snowy or icy conditions may require removal or melting through use of calcium chloride or similar.
	Heavy Lifts	Compliance with E&I EC&HS Procedure 150, Manual Lifting. Lifts of over 50 pounds will be made with two or more personnel or with lifting equipment.
	Heavy Equipment	Employees shall stay visible to heavy equipment operators while equipment is in motion. Employees shall comply with SAIC EC&HS Procedure 26 Powered Industrial Trucks (i.e. Bobcats) and certification will be kept in project files. Skid steer loaders (i.e. Bobcat) will be operated by trained personnel. Hearing protection, as required when working near loud equipment or when personnel have to shout to be heard.

Table 3.2 Activity Hazard Analysis

ACTIVITY: **IDW TANK SAMPLING, FILTERING, AND CLEANING** **ANALYZED BY:** **B. WILLIAMS**

PRINCIPAL STEPS	POTENTIAL SAFETY AND HEALTH HAZARDS	RECOMMENDED CONTROLS
2. Vegetation removal (continued)	Tank tip over	Level D PPE with sturdy work gloves. Chocks or similar will be placed under the round sides of tanks placed on their sides. Tanks containing material will only be tilted and will remain in contact with the ground. Tanks will not be propped beyond an approximate 20 degree angle without being braced and/or chocked on the opposite side. Personnel will stand clear of the tank while the tank is being lifted. Props shall be placed beneath the lifted edge of the tank in such a fashion to adequately support the bottom of the tank and to prevent the tank from sliding forward. Chocks or wedges shall be placed in front of the edge in contact with the ground surface. Hard hats will be required while the tank is being lifted, supported, and chocked and when the chocks and supports are being removed.
	Noise	Hearing protection, as required when working near loud equipment or when personnel have to shout to be heard.
	Contact with sharp edges, reciprocating and rotating machinery	Level D PPE with sturdy work gloves. Tools inspected daily before use and taken out of service if damaged.
	Fire (fuels)	Fuel stored in safety cans with flame arresters. Fire extinguisher (inspected monthly) approximately 30 feet from fuel and/or gasoline powered equipment. Flammables cabinet for indoor storage of > 25 gallons. No ignition sources in fuel storage areas. Bonding (metal to metal contact) and grounding during pouring. Gasoline powered equipment shut down and allowed to cool for a minimum of two (2) minutes prior to fueling.

Table 3.2 Activity Hazard Analysis

ACTIVITY: **IDW TANK SAMPLING, FILTERING, AND CLEANING** **ANALYZED BY:** **B. WILLIAMS**

PRINCIPAL STEPS	POTENTIAL SAFETY AND HEALTH HAZARDS	RECOMMENDED CONTROLS
2. Vegetation removal (continued)	Electrical shock	Electric equipment connected through GFCI. GFCI inspected daily before use. Wiring and equipment listed by nationally recognized testing lab for purpose used. Wiring and lighting must be designed for outdoors use. Inspection of wiring, no frayed wires, loose connections, or exposed wiring. Grounded wiring systems. Protect wiring from damage.
	Temperature extremes	Administrative controls such as taking breaks as needed in climate controlled locations, copious beverage intake in clean areas and after cleaning face and hands, dry clothes for wet work, etc. will be used. Outdoor work will not be performed in weather when the equivalent chill temperature (temperature combined with the effect of wind) is less than -25°F.
3. Water sample and sediment collection from IDW tanks	General safety hazards	Level D PPE. Employees also may don Tyvek® or rain suit, heavy duty PVC or equivalent gloves, rubber over boots, face shield as needed. Site-specific training, HAZWOPER 40-hour training, current refresher training. Radworker Trained. CPR and First Aid training for at least 1 on-site personnel. No confined spaces will be entered. Coordination of all on-site activities with USACE Buffalo district personnel and in accordance with OSHA and USACE requirements.

Table 3.2 Activity Hazard Analysis

ACTIVITY: **IDW TANK SAMPLING, FILTERING, AND CLEANING** **ANALYZED BY:** **B. WILLIAMS**

PRINCIPAL STEPS	POTENTIAL SAFETY AND HEALTH HAZARDS	RECOMMENDED CONTROLS
3. Water and sediment sample collection from IDW tanks (continued)	Uneven and slippery surfaces	Employees shall observe field conditions for potential uneven or slippery surfaces. Employees shall be reminded of the potential presence of these conditions during site-specific training and tailgate briefings. Plastic step stool or fiberglass ladder will be used to access tank. Inspect stool or ladder daily before use. Steps kept free of soil and similar. All legs on level ground surface and stable prior to ascending. Locking mechanisms locked prior to ascending. Snowy or icy conditions may require removal or melting through use of calcium chloride or similar.
	Heavy Lifts	Compliance with E&I EC&HS Procedure 150, Manual Lifting. Lifts of over 50 pounds will be made with two or more personnel or with lifting equipment.
	Heavy Equipment	Employees shall stay visible to heavy equipment operators while equipment is in motion. Employees shall comply with SAIC EC&HS Procedure 26 Powered Industrial Trucks (i.e. Bobcats) and certification will be kept in project files. Skid steer loaders (i.e. Bobcat) will be operated by trained personnel. Hearing protection, as required when working near loud equipment or when personnel have to shout to be heard.

Table 3.2 Activity Hazard Analysis

ACTIVITY: **IDW TANK SAMPLING, FILTERING, AND CLEANING** **ANALYZED BY:** **B. WILLIAMS**

PRINCIPAL STEPS	POTENTIAL SAFETY AND HEALTH HAZARDS	RECOMMENDED CONTROLS
3. Water and sediment sample collection from IDW tanks (continued)	Tank tip over	Level D PPE with sturdy work gloves. Chocks or similar will be placed under the round sides of tanks placed on their sides. Tanks containing material will only be tilted and will remain in contact with the ground. Tanks will not be propped beyond an approximate 20 degree angle without being braced and/or chocked on the opposite side. Personnel will stand clear of the tank while the tank is being lifted. Props shall be placed beneath the lifted edge of the tank in such a fashion to adequately support the bottom of the tank and to prevent the tank from sliding forward. Chocks or wedges shall be placed in front of the edge in contact with the ground surface. Hard hats will be required while the tank is being lifted, supported, and chocked and when the chocks and supports are being removed.
	Fire (fuels)	Fuel stored in safety cans with flame arresters. Fire extinguisher (inspected monthly) approximately 30 feet from fuel and/or gasoline powered equipment. Flammables cabinet for indoor storage of > 25 gallons. No ignition sources in fuel storage areas. Bonding (metal to metal contact) and grounding during pouring. Gasoline powered equipment shut down and allowed to cool for a minimum of two (2) minutes prior to fueling.
	Electrical shock	Electric equipment connected through GFCI. GFCI inspected daily before use. Wiring and equipment listed by nationally recognized testing lab for purpose used. Wiring and lighting must be designed for outdoors use. Inspection of wiring, no frayed wires, loose connections, or exposed wiring. Grounded wiring systems. Protect wiring from damage.
	Noise	Hearing protection, as required when working near loud equipment or when personnel have to shout to be heard.

Table 3.2 Activity Hazard Analysis

ACTIVITY: IDW TANK SAMPLING, FILTERING, AND CLEANING **ANALYZED BY:** B. WILLIAMS

PRINCIPAL STEPS	POTENTIAL SAFETY AND HEALTH HAZARDS	RECOMMENDED CONTROLS
3. Water and sediment sample collection from IDW tanks (continued)	Biological hazards (bees, mosquitoes, ticks, wasps, poison ivy)	PPE (boots, work clothes, taped pant legs as necessary). Insect repellant as necessary.
	Exposure to chemicals (see Table 3.3 Potential Exposure)	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Employees also may don Tyvek® or rain suit, rubber over boots, face shield as needed. Hazard communication training for chemicals used. Material Safety Data Sheets (MSDSs) for chemical tools onsite. Chemical containers labeled to indicate contents and hazard. Wash face and hands prior to taking anything by mouth.
	Temperature extremes	Administrative controls such as taking breaks as needed in climate controlled locations, copious beverage intake in clean areas and after cleaning face and hands, dry clothes for wet work, etc. will be used. Outdoor work will not be performed in weather when the equivalent chill temperature (temperature combined with the effect of wind) is less than -25°F.
4. Mixing and filtering IDW water and cleaning tanks	General Safety Hazards	Level D PPE. Employees also may don Tyvek® or rain suit, heavy duty PVC or equivalent gloves, rubber over boots, face shield as needed. Site-specific training, HAZWOPER 40-hour training, current refresher training. Radworker Trained. CPR and First Aid training for at least 1 on-site personnel. No confined spaces will be entered. Coordination of all on-site activities with USACE Buffalo district personnel and in accordance with OSHA and USACE requirements.

Table 3.2 Activity Hazard Analysis

ACTIVITY: IDW TANK SAMPLING, FILTERING, AND CLEANING **ANALYZED BY:** B. WILLIAMS

PRINCIPAL STEPS	POTENTIAL SAFETY AND HEALTH HAZARDS	RECOMMENDED CONTROLS
4. Mixing and filtering IDW water and cleaning tanks (continued)	Uneven and slippery surfaces	Employees shall observe field conditions for potential uneven or slippery surfaces. Employees shall be reminded of the potential presence of these conditions during site-specific training and tailgate briefings. Plastic step stool or fiberglass ladder will be used to access tank. Inspect stool or ladder daily before use. Steps kept free of soil and similar. All legs on level ground surface and stable prior to ascending. Locking mechanisms locked prior to ascending. Snowy or icy conditions may require removal or melting through use of calcium chloride or similar.
	Fire (fuels)	Fuel stored in safety cans with flame arresters. Fire extinguisher (inspected monthly) approximately 30 feet from fuel and/or gasoline powered equipment (such as power washers and generators). Flammables cabinet for indoor storage of > 25 gallons. No ignition sources in fuel storage areas. Bonding (metal to metal contact) and grounding during pouring. Gasoline powered equipment shut down and allowed to cool for a minimum of two (2) minutes prior to fueling.
	Electrical shock	Electric equipment connected through GFCI. GFCI inspected daily before use. Wiring and equipment listed by nationally recognized testing lab for purpose used. Wiring and lighting must be designed for outdoors use. Inspection of wiring, no frayed wires, loose connections, or exposed wiring. Grounded wiring systems. Protect wiring from damage.

Table 3.2 Activity Hazard Analysis

ACTIVITY: **IDW TANK SAMPLING, FILTERING, AND CLEANING** **ANALYZED BY:** **B. WILLIAMS**

PRINCIPAL STEPS	POTENTIAL SAFETY AND HEALTH HAZARDS	RECOMMENDED CONTROLS
4. Mixing and filtering IDW water and cleaning tanks (continued)	Heavy Equipment	Employees shall stay visible to heavy equipment operators while equipment is in motion. Employees shall comply with SAIC EC&HS Procedure 26 Powered Industrial Trucks (i.e. Bobcats) and certification will be kept in project files. Skid steer loaders (i.e. Bobcat) will be operated by trained personnel. Hearing protection, as required when working near loud equipment or when personnel have to shout to be heard.
	Tank tip over	Level D PPE with sturdy work gloves. Chocks or similar will be placed under the round sides of tanks placed on their sides. Tanks containing material will only be tilted and will remain in contact with the ground. Tanks will not be propped beyond an approximate 20 degree angle without being braced and/or chocked on the opposite side. Personnel will stand clear of the tank while the tank is being lifted. Props shall be placed beneath the lifted edge of the tank in such a fashion to adequately support the bottom of the tank and to prevent the tank from sliding forward. Chocks or wedges shall be placed in front of the edge in contact with the ground surface. Hard hats will be required while the tank is being lifted, supported, and chocked and when the chocks and supports are being removed.
	Heavy Lifts	Compliance with E&I EC&HS Procedure 150, Manual Lifting. Lifts of over 50 pounds will be made with two or more personnel or with lifting equipment.

Table 3.2 Activity Hazard Analysis

ACTIVITY: **IDW TANK SAMPLING, FILTERING, AND CLEANING** **ANALYZED BY:** **B. WILLIAMS**

PRINCIPAL STEPS	POTENTIAL SAFETY AND HEALTH HAZARDS	RECOMMENDED CONTROLS
4. Mixing and filtering IDW water and cleaning tanks (continued)	Exposure to Chemicals	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Employees also may don Tyvek® or rain suit, rubber over boots, face shield as needed. Hazard communication training for chemicals used. MSDSs for chemical tools onsite. Chemical containers labeled to indicate contents and hazard. Wash face and hands prior to taking anything by mouth.
	Noise	Hearing protection, as required when working near loud equipment or when personnel have to shout to be heard.
	Temperature extremes	Administrative controls such as taking breaks as needed in climate controlled locations, copious beverage intake in clean areas and after cleaning face and hands, dry clothes for wet work, etc. will be used. Outdoor work will not be performed in weather when the equivalent chill temperature (temperature combined with the effect of wind) is less than -25°F.
5. Decontamination of sampling equipment with soap and water	General Safety Hazards	Level D PPE. Site-specific training, HAZWOPER 40-hour training, current refresher training. Radworker Trained. CPR and First Aid training for at least 1 on-site personnel. Coordination of all on-site activities with USACE Buffalo district personnel and in accordance with OSHA and USACE requirements.
	Heavy Lifts	Compliance with E&I EC&HS Procedure 150, Manual Lifting. Lifts of over 50 pounds will be made with two or more personnel or with lifting equipment.

Table 3.2 Activity Hazard Analysis

ACTIVITY: **IDW TANK SAMPLING, FILTERING, AND CLEANING** **ANALYZED BY:** **B. WILLIAMS**

PRINCIPAL STEPS	POTENTIAL SAFETY AND HEALTH HAZARDS	RECOMMENDED CONTROLS
5. Decontamination of sampling equipment with soap and water (continued)	Exposure to Chemicals	Level D PPE to include nitrile gloves. Decontamination activities conducted in open area. Wash face and hands prior to taking anything by mouth.
	Noise	Hearing protection, as required when working near loud equipment or when personnel have to shout to be heard.
	Temperature extremes	Administrative controls such as taking breaks as needed in climate controlled locations, copious beverage intake in clean areas and after cleaning face and hands, dry clothes for wet work, etc. will be used. Outdoor work will not be performed in weather when the equivalent chill temperature (temperature combined with the effect of wind) is less than -25°F.
	Uneven and slippery surfaces	Employees shall observe field conditions for potential uneven or slippery surfaces. Employees shall be reminded of the potential presence of these conditions during site-specific training and tailgate briefings. Plastic step stool or fiberglass ladder will be used to access tank. Inspect stool or ladder daily before use. Steps kept free of soil and similar. All legs on level ground surface and stable prior to ascending. Locking mechanisms locked prior to ascending. Snowy or icy conditions may require removal or melting through use of calcium chloride or similar.

Table 3.3 Potential Exposures

Chemical	TLV, PEL, STEL, IDLH, or DAC	Health Effects/Potential Hazards	Chemical and Physical Properties	Exposure Route(s)
Gasoline*	TLV/TWA: 300 ppm IDLH: Ca	Potential carcinogen per NIOSH, dizziness, eye irritation, and dermatitis	Liquid with aromatic odor; FP: -45 F, VP: 38 to 300 mm	Inhalation Ingestion Absorption Contact

* Gasoline is an addition to the potential exposures to Table 3-1 in the MAXIM Technologies generated NFSS SSHP.
TLV = Threshold Limit Value
PEL = Permissible Exposure Limit
STEL = Short Term Exposure Limit
IDLH = Immediately Dangerous to Life or Health
DAC = Derived Air Concentration
TWA = Time Weighted Average
NIOSH = National Institute for Occupational Safety and Health

4.0 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITES

An organizational chart for the IDW task is given in Table 2.1 of the 2004 QCP Addendum. Table 4.1 identifies the SAIC key personnel and their qualifications related to site health and safety. The key personnel responsibilities as they relate to health and safety are outlined in Section 4-2 of Maxim's original Site, Safety, and Health Plan.

Table 4.1 Key SAIC Personnel Assignments and Qualifications for the RI IDW Water Sampling and Disposal at the Niagara Falls Storage Site in Lewiston, New York

Project Assignment	Minimum Degree Requirements	Minimum Qualifications
Project Manager Jeff Dick	B.S. Engineering	13+ years experience in HTRW projects including site investigations and related environmental evaluations / studies.
IDW Task Manager Deb Engelgau	B.S. Engineering or related field	12+ years of experience in HTRW projects including site investigations and engineering evaluations/studies.
Radiation Safety Officer Dave Lyerla	B.S. Health Physics or Radiation Engineering	8+ years of experience in HTRW projects including site investigations associated with radiological contamination.
Field Task Manager/ Field Health and Safety Officer Beau Williams	B.S. Science, Engineering, or related field	6+ years of experience including field sampling and treatability studies.
Other Technical Support Sarah Gibeaut	B.S. Science	Experience in HTRW projects including field sampling or related environmental evaluations/studies.

5.0 TRAINING

All training related to the performance of on-site activities will be completed in accordance with Maxim's SOP 3.0 "Accident Prevention, Training and Medical Surveillance" presented in Appendix C of the original HSRPP.

5.1 COMPREHENSIVE HEALTH AND SAFETY INDOCTRINATION

At the onset of on-site activities, the project personnel (including subcontractors) will be required to have read the Health, Safety, and Radiation Protection Plan (HSRPP) and this Health, Safety, and Radiation Protection Plan Addendum (HSRPPA) and sign a Statement of Understanding attesting that they have read and understand the HSRPP and this HSRPPA.

Prior to the initiation of each phase of the field operations, the Field Task Manager will review the plan with all site personnel. They will be verbally informed of the known and possible hazards of working on this site and instructed on the proper safety procedures that they will be required to practice. All personnel will be instructed and trained in the proper use of all safety equipment and their limitations. All field personnel will be informed of relevant safety procedures and will be furnished with emergency telephone numbers. All on-site personnel and visitors will be briefed on the potential physical and chemical hazards before they are allowed on site. These briefings will be documented in the site log, listing name, date, and subject.

5.2 SPECIALIZED TRAINING

All SAIC field personnel, supervisors, and subcontractor personnel have attended an OSHA required (29 CFR 1910.120) 40-hour training course for safety at hazardous materials sites and 8-hour HAZWOPER annual refreshers as appropriate. The Field Health and Safety Officer is also American Red Cross certified to administer First Aid and CPR. All SAIC supervisory personnel should have received OSHA required 8 hour training for "Hazardous Waste Site Supervision." In addition, all personnel have been trained in the use and limitations of personal protective equipment. The updated training certificates for all SAIC field personnel for this task are included in Attachment 2 of this Addendum.

5.5 RADWORKER TRAINING

All SAIC and subcontractor personnel will be required to have completed instruction in radiation safety or annual updates as appropriate. This training will meet the requirements specified in EM 385-1-1 Section 06.E.3b and 10 CFR 19.12. This training will occur on site prior to the personnel being involved with on-site sampling activities. This training must include the following elements: health effects of ionizing radiation; exposure limits (including those for pregnant workers); use of dosimetry and instruments; effects of radiation on the embryo/fetus; employee rights and responsibilities; site contaminants and probability of exposure; required monitoring; and exposure control methodologies.

6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

The normal work uniform for this site will be Modified Level D consisting of Tyvek suits, boots, and Nitrile or PVC gloves. If during sampling or filtration operations it appears that Modified Level D is not adequate due to difficulty in handling the waste, upgraded poly coated Tyvek may be required for all sampling personnel. If a hazardous situation or the possibility of exposure is encountered or anticipated at the sampling location, the Field Health and Safety Officer in conjunction with the Radiation Safety Officer will evaluate the situation and upgrade the level of PPE as needed.

All PPE will be kept in weatherproof containers. Prior to use, each piece of PPE will be inspected.

8.0 DOSIMETRY

Based on historical RI activities conducted at the site over the past five years, Personal Monitoring Devices (PMD) will not be required for this task. However, during sampling activities, the person most likely to inhale radioactive material, as determined by the job coverage health physics technician, will be monitored with a breathing zone air sample. All personnel in the immediate area will be assigned dose based on that air sample.

15.0 EMERGENCY RESPONSE

In the event that an emergency develops on-site, the procedures outlined within this section will be immediately followed.

Emergency conditions are considered to exist if:

1) Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure while on the site;

2) A condition is discovered that suggests the existence of a situation more hazardous than anticipated;

3) After an explosion, or;

4) A fire occurs on-site while working.

In case of any of the above events, the following procedures will be followed.

1) Notify the paramedics, security and/or fire department immediately.

2) Signal and implement the evacuation procedure.

3) Isolate the area.

4) Stay upwind of any fire.

5) Keep the area surrounding the problem clear after the incident.

6) Complete the accident report form and distribute to the appropriate personnel.

Emergency numbers will be posted in each vehicle and kept readily available to the field crew. All personnel will be aware of the location of the closest telephone and/or radio communications.

The following is a list of the emergency phone numbers:

Fire Dept.: Lewiston Fire Co. #1	Emergency 911 Non-Emergency (716) 754-4487
Police: Niagara County Sheriff	Emergency 911 Non-Emergency (716) 438-3393
Hospital: Mount Saint Mary's Hospital	Emergency 911 Non-Emergency (716) 297-4800
Ambulance Service	911 (or) call Fire Dept. above
Western New York Poison Control	1-800-764-7661
National Response Center (NRC) **Toxic Chemical and Oil Spills:**	1-800-424-8802
USACE Buffalo Site Safety and Health Officer **Tony Cappella**	(716) 879-4173
USACE Buffalo Site Supervisor **Dennis Rimer**	(716) 879-4444 (office) (716) 912-5833 (cell phone)
USACE Buffalo Project Manager **Dr. Judith Leithner**	(716) 879-4234
USACE Buffalo Health Physicist **Tom Papura**	(716) 879-4270
SAIC-Dublin Office **FAX**	(614) 793-7600 (614) 793-7620
NFSS Maxim Office Trailer **FAX**	(716) 754-9141 (716) 754-9136

NOTE: The emergency 911 number should work on mobile phones. When providing SAIC's mobile phone number to emergency personnel, ensure that any required "ROAM" access number for the area the unit is operating in is stated. In addition, the appropriate area code should be stated along with the phone number.

Directions to Mount Saint Mary's Hospital: Exit the site , turning right (west) onto Pletcher Road, turn left (south) onto Route 18 South (Creek Road), stay on Route 18 South while it becomes Route 104, turn left at the traffic light onto Route 265 (Military Road). Mount St. Mary's Hospital is approximately ½ mile on the right. A map showing the route to Mount Saint Mary's Hospital is included in Attachment 1 of this Addendum.

REFERENCES

MAXIM Technologies Inc. (MAXIM) 1999. Site Safety and Health Plan Remedial Investigations at the Niagara Falls Storage Site, Draft Final. MAXIM, September, 1999.

MAXIM Technologies Inc. (MAXIM) 2000. Site Safety and Health Plan Addendum for Phase II of the Remedial Investigations at the Niagara Falls Storage Site, Revised Draft. MAXIM, August, 2000.

MAXIM Technologies Inc. (MAXIM) 2002. Site Safety and Health Plan Remedial Investigations at the Niagara Falls Storage Site, Addendum. MAXIM, May, 2002.

Appendix B.1

Radiation Protection Plan Addendum

PURPOSE

This document is a supplement to the Radiation Protection Plan implemented during Phase Two of the Maxim RI, as amended from Phase One. Only revisions to the previous plan are noted.

PLAN REVISIONS

Investigative Derived Waste (IDW) was generated from multiple field efforts of well development, well sampling, surface waste sampling, and decontamination activities. The waste water generated during these field efforts will need to be sampled, characterized, filtered, and disposed. This amendment will address the radiological concerns for performing the sampling, characterization, filtration, and disposal of the IDW water at the Niagara Falls Storage Site.

Sampling equipment will be comprehensively surveyed for total and removable surficial contamination upon arrival at the site, and prior to removal from the site.

Water treatment personnel will receive radworker training (unless already current) prior to work at the site. Work areas will be surveyed for gamma radiation with a Bicron Microrem dose rate meter, or equivalent. A Ludlam alph/beta meter will also be used as appropriate (i.e. Tank 3).

At the completion of each tank sampling, the sample equipment, water samples and any areas of visible soil, will be surveyed for removable contamination. Any contaminated equipment, when compared with the existing surficial contamination limits, will be contained and decontaminated.

During sampling activities, the person most likely to inhale radioactive material, as determined by the job coverage health physics technician, will be monitored with a breathing zone air sample. All personnel in the immediate area will be assigned dose based on that air sample.

Also, solid IDW will not be surveyed for surficial radiological contamination during this task. All solid IDW will be containerized, labeled, stored, and disposed of as radioactive material.

IDW WATER TREATMENT SUPPLEMENT- RADIOLOGICAL ACTIVITY HAZARD ANALYSIS

Safety and Health Hazards	Probability/ Severity	Controls	Monitoring
IDW WATER TREATMENT			
Radiological surficial contamination	Very Low /Very Low	PPE (Level D modified with Tyvek suits, boots, and Nitrile or PVC gloves) may be upgraded to poly coated Tyvek as determined by Health Physics. Medical clearance for HAZWOPER work Minimal contact, wash face and hands prior to taking anything by mouth.	Site entry and exit surficial contamination surveys of equipment. Personnel contamination surveys conducted prior to sample area exit and periodically as determined by Health Physics.
Radiological airborne exposure	Very Low /Very Low	Removable contamination surveys will be performed on potentially contaminated equipment / soil. Engineering controls and/ or respiratory protection will be implemented if occupational air sampling indicates airborne concentrations exceeding 0.25 DAC.	Occupational air sampling (breathing zone) of individual most likely to be exposed as determined by Health Physics. Wet down soil sediment prior to removal from tanks.

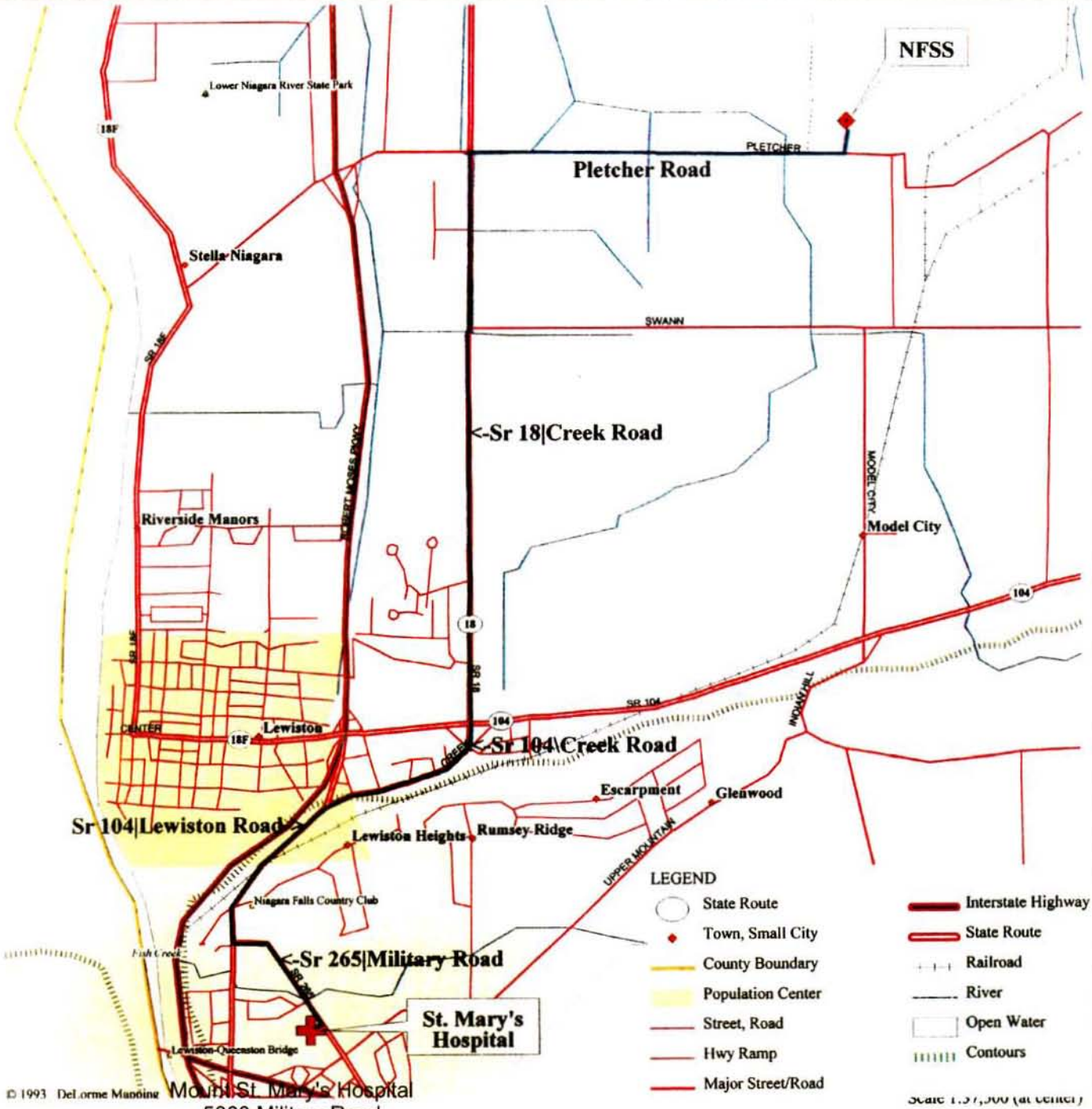
REFERENCES

MAXIM Technologies Inc. (MAXIM) 1999. Radiation Protection Plan for the Remedial Investigation at the Niagara Falls Storage Site. MAXIM, July, 1999.

MAXIM Technologies Inc. (MAXIM) 2000. Radiation Protection Plan for the Remedial Investigation at the Niagara Falls Storage Site, Addendum. MAXIM, August, 2000.

Attachment 1

Route to Mount Saint Mary's Hospital from NFSS



Mount St. Mary's Hospital
5300 Military Road
Lewiston, NY 14092
Phone 297-4800

Directions from NFSS Main Gate:

1. Turn right onto Pletcher Road
2. Turn left onto Route 18 South (Creek Rd)
3. Stay on Route 18 South / turns into Route 104
4. Turn left at traffic light onto Route 265 (Military Rd)

Hospital is about ½ mile on right

ROUTE TO LOCAL HOSPITAL FROM NFSS
Niagara Falls Storage Site
Lewiston, New York

MAXIM TECHNOLOGIES INC SAINT LOUIS

Project #: 9905006	Figure #: 15-1
Scale: As indicated	Date: 09-22-99
Drawn by: DCJ	Checked by: JLR

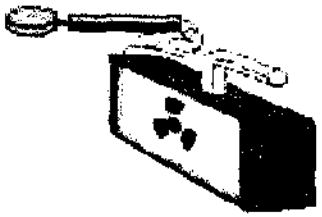
Attachment 2

Training Certificates

Science Applications International Corporation
An Employee-Owned Company

Does hereby certify that

David Lyerla



has successfully completed the

8-HOUR HAZWOPER REFRESHER

course of instruction that complies with the requirements in 29 CFR 1910.120.

Topics included:
- Hazardous Waste Operations
- DOT Safety
- Level D&C PPE
- Emergency Response
- CERCLA Overview
- Respiratory Protection (29CFR1910.134)
- Hearing Protection (29CFR1910.95)
- Hazard Communication (29CFR1910.1200)
- Radiological Worker Training (10CFR19.12)
- RCRA Refresher

Class Date: January 28, 2004
Expires: January 28, 2005
Number: SAIC 20040128-016 8HR

Randy Hansen, SAIC SSHO

Presented to:

Beau Williams

For successfully completing:

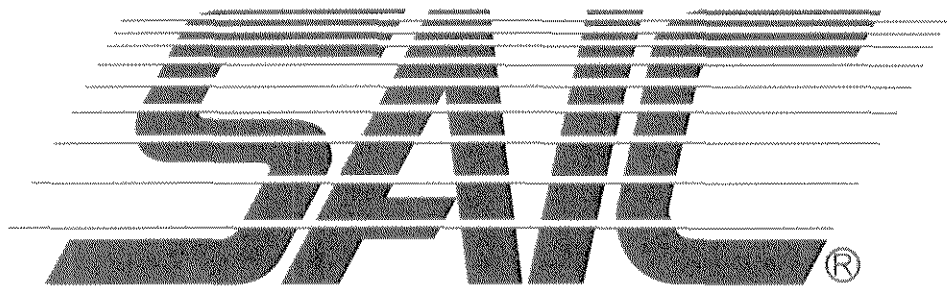
8-HOUR HAZARDOUS WASTE SUPERVISOR COURSE

[Mandated by 29 CFR 1910.120]

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
151 Lafayette Drive • Oak Ridge, TN 37830
An Employee-Owned Company

Training Date and Certificate No.
8/25/04-1

Stephen L Davis
Course Instructor



Presented to:

Beau J. Williams

For successfully completing:

8-Hour Refresher Course

Hazardous Waste Operations (Mandated by 29 CFR 1910.120)
DOT Chemical Safety (Mandated by 49 CFR 172.700.H)
Respiratory Protection (Mandated by 29 CFR 1910.134)
Hearing Protection (Mandated by 29 CFR 1910.95)
Hazard Communication (Mandated by 29 CFR 1910.1200)
Level D&C PPE (Mandated by 29 CFR 1910.120)
Vehicle Operation and Defensive Driving (ECHS 110)
Manual Lifting (ECHS 150)

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
151 Lafayette Drive • Oak Ridge, TN 37830
An Employee-Owned Company

Training Date and Certificate No.

3/18/04-14

Expires one year from above date

Course Instructor

ENVIRONMENTAL, SAFETY & INDUSTRIAL HYGIENE

Emilcott-dga Inc.

HEALTH, SAFETY AND ENVIRONMENTAL TRAINING PROGRAM

This Certifies That

Beau J. Williams

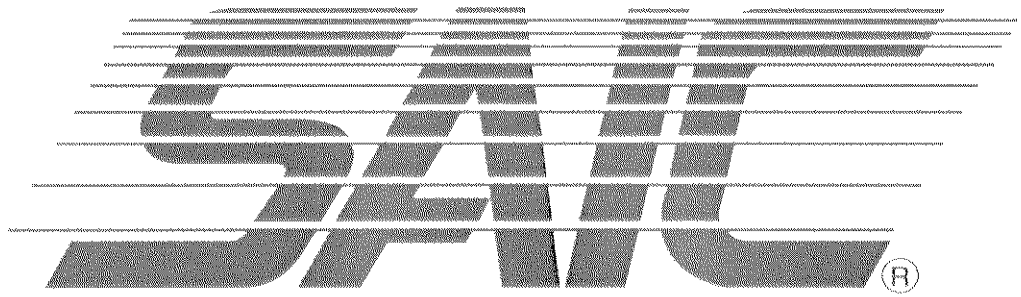
Has Successfully Completed

40-Hour Health and Safety Training Course for Hazardous Waste Operations

Date ~~April 2, 1998~~ Location ~~Westerville~~

Dianne Grote Adams

Dianne Grote Adams, CIH, CSP *Course Director*



Science Applications International Corporation

An Employee-Owned Company

Presented to:

Beau Williams

For successfully completing:

DOT/IATA 2-HOUR COURSE

General Awareness Training *as required by the Department of Transportation and International Air Transport Association*

Limited Function Specific Training *as required by the Department of Transportation and International Air Transport Association to address*

- **Sample shipping**
- **Shipping in support of environmental field operations**

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION
800 Oak Ridge Turnpike
Oak Ridge, TN 37830

Certificate No.
2/19/02-5

Stephen L Davis

Course Instructor

American Red Cross

Together, we can save a life

This recognizes that

BEAU WILLIAMS

has completed the requirements for

ADULT CPR

conducted by

Science Applications International Cor

Date completed **07/15/2004**

The American Red Cross recognizes this certificate as valid for **1** year(s) from completion date.

American Red Cross

Together, we can save a life

This recognizes that

BEAU **WILLIAMS**

has completed the requirements for

STANDARD FIRST AID

conducted by

Science Applications International Cor

Date completed **07/15/2004**

The American Red Cross recognizes this certificate as valid for **3** year(s) from completion date.

Chairman, American Red Cross

Instructor's Signature

M. C. Parado /KU

Chapter

Summit County Chapter

Holder's Signature

Cert. 653998 (Rev. Oct. 2001)

Chairman, American Red Cross

Instructor's Signature

M. C. Parado /KU

Chapter

Summit County Chapter

Holder's Signature

Cert. 653998 (Rev. Oct. 2001)

Columbus State Community College

Environmental Technology

acknowledges the participation of

Sarah A. Gibeaut

in the

OSHA 40-Hour
Hazardous Waste Site Worker
Health & Safety Training

in accordance with 29 CFR 1910.120 (e)
held in Columbus, Ohio, January 9 through March 12, 2004
Certificate #: 1200
Date of Certificate: 3/12/04

Antoinette Baldin, Chair
Construction Sciences Department

COLUMBUS STATE Community College

Jeffrey K. Bates, Associate Professor
Environmental Technology

FOR AGENCY USE ONLY

Part A. TO BE COMPLETED BY APPLICANT OR EMPLOYEE *(typewrite or print in ink)*

1. NAME *(last, first, middle)* Rimer W. Dennis

3. SEX ☑ MALE ☐ FEMALE

4. DATE OF BIRTH 6/21/47

5. DO YOU HAVE ANY MEDICAL DISORDER OR PHYSICAL IMPAIRMENT WHICH WOULD INTERFERE IN ANY WAY WITH THE FULL PERFORMANCE OF THE DUTIES SHOWN BELOW?

☐ YES ☑ NO

(If your answer is "YES" explain fully to the physician performing the examination)

6. I CERTIFY THAT ALL THE INFORMATION GIVEN BY ME IN CONNECTION WITH THIS EXAMINATION IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF

W. Dennis Rimer

(signature of applicant)

Part D. TO BE COMPLETED BY AGENCY MEDICAL OFFICER *(if one is available)*

NOTE: Review the attached certificate of medical examination and make your recommendations in item 1 below. If the medical examination was done for pre-appointment purposes, circle the appropriate handicap code in part F.

1. RECOMMENDATION:

☐ HIRE OR RETAIN. DESCRIBE LIMITATIONS, IF ANY, HERE.

☐ TAKE ACTION TO SEPARATE OR DO NOT HIRE. EXPLAIN WHY.

2. AGENCY MEDICAL OFFICER'S NAME *(type or print)*	3. LOCATION *(city, State, ZIP code)*	4. DATE

Part E. TO BE COMPLETED BY AGENCY PERSONNEL OFFICER

NOTE: Enter the action taken below. If this form is used for pre-appointment purposes, be sure the appropriate handicap code in part F is circled. *IMPORTANT: See FPM Chapter 293, Subchapter 3; FPM Chapter 339 and FPM Supplement 339-31 for disposition and/or filing of both parts of this form, either separately or together.*

1. ACTION TAKEN:

☐ HIRED OR RETAINED. ☐ NON-SELECTED FOR APPOINTMENT, OR ELIGIBILITY OBJECTED TO.

☐ ACTION TAKEN TO SEPARATE.

2. AGENCY PERSONNEL OFFICER'S NAME *(type or print)*	3. SIGNATURE	4. DATE

Part F. HANDICAP CODE *(to be completed only in pre-appointment cases)*

If the person examined has or had a handicap listed below, circle the code number which pertains to that handicap. If more than one handicap applies, circle the one considered most limiting. If none of the handicap codes apply, circle "00".

00	No handicap of the type listed	40	Hearing aid required	52	Diabetes - controlled
10	Amputation - one major extremity	41	No usable hearing	53	Epilepsy - adequately controlled
11	Amputation - two or more major extremities	42	No usable hearing, with speech malfunction	54	History of emotional behavioral problems requiring special placement effort
20	Deformity or impaired function - upper extremity	43	Normal hearing, with speech malfunction	55	Mentally retarded
21	Deformity or impaired function - lower extremity or back	50	Tuberculosis - inactive pulmonary	56	Mentally restored
30	Vision - one eye only	51	Organic heart disease *(compensated)* - valvular, arrhythmia, arteriosclerosis, healed coronary lesions		
31	No usable vision				

1. EXAMINING PHYSICIAN'S NAME *(type or print)* C. Steinagle

2. ADDRESS *(including ZIP Code)* [redacted]

3. SIGNATURE OF EXAMINING PHYSICIAN

[signature] *(signature)* 4/23/04 *(date)*

IMPORTANT: After signing, return *the entire form intact* in the pre-addressed "Confidential-Medical" envelope which the person you examined gave you.

HWW268

Niagara County Community College
Division of Community Education

Certificate of Completion

This is to certify that

W. DENNIS RIMER S.S.# 067-36-1298

29 CFR 1910.120 (e)(2) has successfully completed

40 HR HAZ WASTE SITE WORKER TRNG PROGRAM

Dates of Attendance 6/22/92 - 6/26/92

Examination Pass Date 6/26/92

Expiration Date 6/26/93

Eugene Lynn 6/26/92
Director of Corporate Training, Niagara County Community College Date

Mary C. Bolduc-Fiorito 6/26/92
Instructor Date

entific Resources
t Big Beaver
48084

; site address is

T

T

Certificate of Completion

Warren Rimer

In Recognition of Having Successfully Completed

HAZWOPER 8 HOUR ANNUAL REFRESHER

on

November 21, 2002

in accordance with

OSHA 29 CFR 1910.120(e)(8)/1926.65(e)(8) HAZWOPER Standard

Steven W. Skipper, CIH, CSP KSR-02- 1317

Certificate of Completion

Warren Rimer

In Recognition of Having Successfully Completed

HAZWOPER 8 HOUR ANNUAL REFRESHER

On

November 21, 2002

in accordance with

OSHA 29 CFR 1910.120(e)(8)/1926.65(e)(8) HAZWOPER Standard

Steven W. Skipper, CIH, CSP

KSR-02-1317

UNITED STATES ARMY CORPS OF ENGINEERS
BUFFALO DISTRICT

This certificate confirms that

Dennis Rimer

has successfully completed 16 hours of

Radiation Worker Training

and is hereby granted unescorted access to radiologically restricted areas under the control of the U.S. Army Corps of Engineers, Buffalo District in accordance with the requirements of the Buffalo District Radiation Protection Program

Signed CM Hallam RSO Date 24 OCT 2002

Christopher M. Hallam, Buffalo District RSO

STATE UNIVERSITY OF NEW YORK AT BUFFALO
TOXICOLOGY RESEARCH CENTER
3435 Main Street, 134 Cary Hall, Buffalo, NY 14214-3000
(716) 829-2125

New Jersey/New York

Providing Safety and Health Training for: Emergency Response Employees, Superfund Site Employees, and RCRA TSD Site Employees

This Certifies that on February 26 to 27, 2001

Dennis Rimer

Attended and Successfully Completed the 12 hour

LEAD HAZARD AND SAFETY AWARENESS AND LEAD CONSTRUCTION REGULATIONS REVIEW TRAINING COURSE

(Detail of 29 CFR 1926.62 & 29 CFR 1910.134, general information and health effects of lead exposure, lead hazard control, lead monitoring, sampling, and waste disposal)

Certification Number: LAWCSRC-01/02/27-014

Issue Date: February 27, 2001

Instructor, Hazardous Materials Education	Director, Hazardous Materials Education	Director, Toxicology Research Center

U.S. ARMY CORPS OF ENGINEERS

PROFESSIONAL DEVELOPMENT SUPPORT CENTER
HUNTSVILLE, ALABAMA

CERTIFICATE
this is to certify that

Dennis Rimer

has completed the Corps of Engineers Training Course
HAZARDOUS WASTE MANIFESTING/DOT RECERTIFICATION 12-HOUR REFRESHER

and has been tested in function specific areas in a sincere effort to comply with Department of Transportation and Environmental Protection Agency regulations

Given at *Buffalo, NY* (LOCATION) *9 - 10 March 2004* (DATE)

Gary L Anderson
Chief, USACE Professional Development Support Center

Richard J Waglas

CEHR-P Form 586 (REVISED)
1 AUG 98

U.S. ARMY CORPS OF ENGINEERS

PROFESSIONAL DEVELOPMENT SUPPORT CENTER
HUNTSVILLE, ALABAMA

CERTIFICATE
this is to certify that

Dennis Rimer

has completed the Corps of Engineers Training Course
RADIOACTIVE WASTE MANIFESTING/DOT RECERTIFICATION

and has been tested in function specific areas in a sincere effort to comply with Department of Transportation and Environmental Protection Agency regulations

Given at *Buffalo, NY* (LOCATION) *9 - 11 March 2004* (DATE)

Chief, USACE Professional Development Support Center

CEHR-P Form 586 (REVISED)
1 AUG 98