WATER MANAGEMENT PLAN
(Appendix J of the Site Wide Removal Action Work Plan)
FUSRAP ST. LOUIS AIRPORT SITE
ST. LOUIS, MISSOURI

TOTAL ENVIRONMENTAL RESTORATION
CONTRACT NO. DACA 45-96-D-0007
TASK ORDER NO. DK02

Submitted to:

Department of the Army
U.S. Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106-2896

Department of the Army
U.S. Army Engineer District, St. Louis
Corps of Engineers
FUSRAP Project Office
8945 Latty Avenue
Berkeley, Missouri 63134-1024

Submitted by:

Shaw Environmental, Inc.
110 James S. McDonnell Boulevard
Hazelwood, Missouri 63042-3102

February 27, 2004

Revision 1

Issued to: _____ Date: _____

Copy #: _____ ☐ Controlled ☒ Uncontrolled

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February 27, 2004

Revision 1

Reviewed/
Approved by: Bruce A. Tag for J. Eberlin Date: 2-27-04
John Eberlin
Project Manager

Reviewed/
Approved by: _____ Date: 2/27/04
Ken Beach, P.E.
Engineering Manager

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE

DATE: 12/16/2003

TRANSMITTAL NO.: 0487A

Section I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (This section will be initiated by the contractor)

TO: U.S. Army Corps of Engineers Mr. D. Mueller 9170 Latty Ave Berkley, MO 63134	FROM: Shaw Environmental, Inc. Mr. J. Eberlin 110 James S. McDonnell Blvd. Hazelwood, MO 63042	TRANSMITTAL PURPOSE: ☑ GOVERNMENT APPROVAL ☐ INFORMATION ONLY	CONTRACT NO. DACA 45-96-D-0007	CHECK ONE: ☐ THIS IS A NEW TRANSMITTAL ☑ THIS IS A RESUBMITTAL OF 0487

SPECIFICATION SECTION NO. (Cover only one section with each transmittal):

PROJECT TITLE AND LOCATION: FUSRAP - St. Louis Airport Site, St. Louis, MO

ITEM # a.	DESCRIPTION OF ITEM SUBMITTED b.	MFG OR CONTR CAT., CURVE DRAWING OR BROCHURE NO. c.	NO. OF COPIES d.	CONTRACT REFERENCE DOCUMENT: SPEC. PARA. NO. e.	CONTRACT REFERENCE DOCUMENT: DRAWING SHEET NO. f.	FOR CONTRACTOR USE CODE g.	VARIATION h.	FOR C E. USE CODE i.
1	Water Management Plan (Appendix J of the Site Wide Removal Action Work Plan) Revision 1		15			A	NA	

REMARKS

Plan revised per 7-3-03 responses to comments and 8-12-03 meeting among J. Schwenk, R. Frerker, and J. Enger. Cc: Ken Beach, John Enger, Bruce Fox, Document Control, Engineering Library, Gerry Rood, Michele Lyerla, Rob Elfrink, Quality Control

QC CERTIFICATION

☒ This item(s) has been reviewed in detail and is correct and in strict conformance with the contract drawings and specifications.

☐ Approved with corrections as noted on submittal data and/or attached sheet(s)

Michael A. Steiner for Sam Worthy

DATE: 12/18/03

I certify that the above-submitted items have been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated.

John Eberlin

John Eberlin, Project Manager

DATE: 12/18/03

Section II - APPROVAL ACTION

ENCLOSURES RETURNED (List by Item No.)

NAME, TITLE, AND SIGNATURE OF APPROVING AUTHORITY

DATE

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE	DATE 12/16/2003	TRANSMITTAL NO. SLAPS - 0487A

Section I - REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (This section will be initiated by the contractor)

TO:	FROM:	TRANSMITTAL PURPOSE:	CONTRACT NO.	CHECK ONE:
SW-SLAPS 110 McDonnell Blvd. Hazelwood, MO 63042	SW SLAPS Engineering	☑ GOVERNMENT APPROVAL ☐ INFORMATION ONLY	DACA 45-96-D-0007	☐ THIS IS A NEW TRANSMITTAL ☑ THIS IS A RESUBMITTAL OF 0487

SPECIFICATION SECTION NO. (Cover only one section with each transmittal):

PROJECT TITLE AND LOCATION: FUSRAP - St. Louis Airport Site , St. Louis, MO

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				SPEC. PARA. NO.	DRAWING SHEET NO.			
a.	b.	c.	d.	e.	f.	g.	h.	i.
1	Water Management Plan (Appendix J of the Site Wide Removal Action Work Plan) Revision 1		24			A	NA	

REMARKS

Plan revised per 7-3-03 responses to comments and 8-12-03 meeting among J. Schwenk, R. Frerker, and J. Enger. Cc: Ken Beach, John Enger, Bruce Fox, Document Control, Engineering Library, Gerry Rood, Michele Lyerla, Rob Elfrink, Quality Control

Name, Title And Signature Of Approving Authority:

Ken Beach, Engineering Manager

12/16/2003
DATE:

Section II - APPROVAL ACTION

ENCLOSURES RETURNED (List by Item No.)

NAME, TITLE, AND SIGNATURE OF APPROVING AUTHORITY

DATE

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TOTAL ENVIRONMENTAL RESTORATION
CONTRACT NO. DACA 45-96-D-0007
TASK ORDER NO. KC 02

Submitted to:

Department of the Army
U.S. Army Engineer District, Kansas City
Corps of Engineers
700 Federal Building
Kansas City, Missouri 64106-2896

Department of the Army
U.S. Army Engineer District, St. Louis
Corps of Engineers
FUSRAP Project Office
8945 Latty Avenue
Berkeley, Missouri 63134-1024

Submitted by:

Shaw Environmental, Inc.
110 James S. McDonnell Boulevard
Hazelwood, Missouri 63042-3102

December 16, 2003

Revision 1

Issued to: USACE Date: 12/16/03

Copy #: 09 ☐ Controlled ☒ Uncontrolled

WATER MANAGEMENT PLAN
(Appendix J of the Site Wide Removal Action Work Plan)
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Submitted by:

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December 16, 2003

Revision 1

Reviewed/
Approved by: John Eberlin Date: 12-16-03
John Eberlin
Project Manager

Reviewed/
Approved by: Kenneth C. Beach Date: 12-16-03
Ken Beach, P.E.
Engineering Manager

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Submitted by:

Shaw Environmental, Inc.
110 James S. McDonnell Boulevard
Hazelwood, Missouri 63042-3102

December 16, 2003

Revision 1

Reviewed/
Approved by _____ Date: 12-16-03
Sam Worthy
Quality Control Manager

Reviewed/
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Bruce Fox
Operation Manager

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Michele Lyerla
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Approved by _____ Date: 12/16/03
Gerald Rood
Radiation Safety Officer

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Approved by _____ Date: 12/16/03
Robert Elfrink
Site Safety & Health Manager

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LIST OF ABBREVIATIONS AND ACRONYMS

ARARs	applicable or relevant and appropriate requirements
CEMVS	U.S. Army Corps of Engineers St. Louis District
CFR	Code of Federal Regulations
CSR	Code of State Regulations
DOT	U.S. Department of Transportation
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
FUSRAP	Formerly Utilized Sites Remedial Action Program
gpd	gallons per day
µg/L	microgram(s) per liter
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDNR	Missouri Department of Natural Resources
MSD	Metropolitan St. Louis Sewer District
NPDES	National Pollutant Discharge Elimination System
pCi/gm	picoCuries per gram
pCi/ug	picoCuries per microgram
pCi/L	picoCuries per liter
Ra	radium
Shaw	Shaw Environmental, Inc.
SLAPS	St. Louis Airport Site
Th	thorium
U	uranium
USACE	U.S. Army Corps of Engineers
VP	Vicinity Property

1.0 Purpose

The purpose of this plan is to define the processes and procedures to be used to manage the four types of water listed below that is expected to be encountered at SLAPS (St. Louis Airport Site).

- Storm water
- Excavation water
- Miscellaneous sources of water (e.g., returned water samples and onsite water treatment waste streams and decontamination water)
- Water generated at other North County Sites (Vicinity Properties, (VP)s).

Criteria applicable to SLAPS water management include discharge criteria specified by the National Pollutant Discharge Elimination System (NPDES) discharge permit equivalent to Coldwater Creek (Missouri Department of Natural Resources (MDNR), 1998) and the discharge permit to the Metropolitan Sewer District(MSD) sewer system (MSD, 2001). In addition to monitoring the parameters at the frequencies specified in the NPDES permit equivalent, SLAPS maintains a running annual average for total uranium, thorium, and radium with weighted concentrations for the outfalls reported to MDNR quarterly through U.S. Army Corps of Engineers (USACE) (see Appendix for 2003 to date). The radioactive contaminants and respective surface water discharge criteria are listed in Table 2 and are based on the requirements of 10 CFR 20 App. B.

Implementation of this plan will consider project goals while maintaining compliance with offsite discharge criteria. Generation of contaminated water during excavation and the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) verification process will require use of best management practices such as minimizing open excavation areas and selective lining of excavation above the water table. Non-releasable water will be stored in tanks and lined basins and will either be sprayed within contaminated areas or treated for offsite discharge. A combination of these water management methods will be used to minimize overall project costs.

2.0 Water Management Areas

The 27.6-acre SLAPS site (inclusive of Coldwater Creek area to be remediated) consists of radiologically uncontrolled and controlled areas. Figure 1 depicts water management features (i.e., surface flow. storage and treatment area, and discharge points) and removal phase boundaries. Requirements and methods of water management are dependent on factors including whether or not the area is controlled, and/or being excavated, depth to groundwater table, and soil and weather conditions.

2.1 Uncontrolled Areas

Radiologically uncontrolled areas are those areas where removal actions are complete and clean backfill has been placed and yet to be remediated areas having a protective cover allowing unrestricted access. Uncontrolled areas primarily drain to outfall 003 which is no longer monitored under the SLAPS NPDES permit equivalent (MDNR, 2002). However, ground cover must be maintained to prevent erosion that would result in sediment transport offsite above the discharge limit of 1.5 mL/L/hr daily maximum and 1.0 mL/L/hr monthly average. Ground cover includes an adequate stand of grass, aggregate surface, geofabric, geosynthetic liner, asphalt, or other erosion resistant material resistant to water and wind erosion. Based on the site grading and drainage plan (S&W, 2001a) and associated calculations (S&W, 2001b), the area east of the modular building and north of the loadout pad have been graded to outfall 003. Remediated and backfilled Radium Pits, Phase 1, and Phases 2 and 3 areas flow to a retention basin east of the sedimentation basin and is then either pumped to the sedimentation basin overflow discharge vault (outfall 001a) or to outfall 001b.

2.2 Controlled Areas

Radiologically controlled areas are those areas yet to be remediated where access is restricted without proper training and use of personal protective clothing and equipment. Areas onsite that are yet to be remediated (i.e. western portion of Phases 2 and 3 through 6) flow to the sedimentation basin which discharges through outfall 001a.

3.0 Offsite Discharge

3.1 Discharge Criteria

Radiological and non-radiological discharge criteria for discharge through outfall 001a are contained in the October 2, 1998 SLAPS NPDES permit equivalent issued by MDNR (MDNR, 1998). In addition to the NPDES permit equivalent, water meeting MSD influent requirements (MSD, 2001) may be discharged to the MSD sewer system. SLAPS surface water discharge criteria are summarized in Tables 1, 2, and 3. Table 4 contains SLAPS water, applicable or relevant appropriate requirements, (ARARs) to be used as a guide in addressing any changed conditions and VPs with respect to water discharges, or the USACE could request a variance to the specified discharge limit from the State of Missouri Clean Water Commission.

Discharge of treated water to MSD is limited to 100,000 gallons per day (gpd) on a batch basis. MSD has made exceptions to these discharge restrictions based on requests by USACE and Shaw Environmental, Inc. (Shaw) Pending future treated water discharge needs, additional modifications to discharge restrictions, such as continuous discharges, will be requested as needed to more efficiently treat and discharge water while assuring compliance with MSD influent criteria.

3.2 Monitoring

Onsite monitoring is performed according to SLAPS Compliance Group Instruction-2, CGI-2, Water Sampling Procedure, March 5, 2003. Outfall 001a is automatically sampled and the flow recorded using Isco carrousel sampler and flow meter. Outfall 002 is monitored for NPDES permit equivalent parameters once per year, and Outfall 003 has been removed from the monitoring program per MDNR consent (MDNR, 2002).

In addition to the required monitoring by regulatory agencies, USACE and Shaw performs onsite water monitoring by taking informational water samples and performing water management surveillances. Field Engineering and Compliance take informational samples to determine the most appropriate disposition of water (e.g., need for storage or discharge to sedimentation basin). Water management surveillances are performed informally by Field Engineering and Operations personnel on a daily basis in ongoing work areas and formally by Quality Control on a weekly basis site wide. Surveillances consist of site walkovers to identify conditions that have a significant potential to cause erosion and lead to exceedences of surface water discharge criteria. Potential causes of erosion or increase in contaminant surface runoff such as damaged or deteriorated silt fence, liners, and eroding drainage ditches will be recorded and reported to the

site manager for corrective action. The weekly site wide water management surveillance is included in the Quality Control daily report on the day the surveillance is performed.

Miscellaneous sources of water such as returned water samples are characterized by the Compliance Group either by sample results and knowledge of preservative and reagents used or through analysis of composited samples being returned. The Compliance Group will consult Field Engineering as to the most appropriate disposition for the water onsite (e.g., storage location, use for dust suppression, or addition into the treatment process).

Water generated at other North County Sites will be addressed on a case-by-case basis taking into consideration any other contaminants other than those at SLAPS. Informational samples following use of the data quality objective (DQO) process may be taken in order to determine the disposition of the vicinity property water (e.g., discharge from the VPs, transport to SLAPS and store, spray, or treat) and transportation labeling and manifesting requirements.

Decontamination of equipment is presently performed on the loadout pad. Decontamination water is allowed to drain onto the loadout pad. As is the case with sprayed water within the controlled area, decontamination water quantities are intermittent and small enough (< 300 gallons) that flow into the sedimentation basin does not result from decontamination activities.

4.0 Water Management Methods

In order to meet Coldwater Creek and MSD discharge criteria and minimize the amount of water which potentially could interface with contamination, water management procedures to be used include the following:

- Implement and maintain erosion control and sediment retention features such as use of silt fences, coconut mat, dressing of contaminated soil stockpiles, and use of geotextile or plastic sheeting and liners.
- Reduce the amount and contain excavation water requiring treatment by berming around and within excavations.
- Avoid contamination of precipitation from within excavations above the groundwater table by minimizing open areas below the groundwater table and using plastic liners on top of excavated surfaces when not actively excavating.
- Spray contaminated water in the controlled area for dust suppression and to enhance evaporation while preventing runoff to the sedimentation basin.
- Treat contaminated water from excavations to discharge criteria for offsite discharge.
- Store contaminated water above discharge limits in storage tanks and lined basins until treatment capacity is available.

Informational and outfall 001a water sample analyses are evaluated to determine the most appropriate disposition of water and evaluate the effectiveness of water management measures. Informational sample results are also used to characterize water for the sake of storage and treatment. Informational sample results also are used to determine probable areas of highest contaminant runoff. These areas of higher contamination are then addressed in order to minimize contaminant transport to the sedimentation basin (e.g. lining of the south ditch just east of Gate 1 and areas within Banshee ditch, Phase 6).

Precipitation falling onsite will be addressed in the following manner:

- Precipitation falling on confirmed radiologically clean backfilled areas (i.e. East End) is considered clean and is not sampled.
- Sumps used for water storage or management in controlled areas will be sampled and analyzed for uranium to determine appropriate discharge or management. Water with a total uranium result > 300 pCi/L will be treated or sprayed as dust control in controlled areas only, provided this is done in consideration of existing ground conditions and coordinated with the weather forecast to avoid contaminant runoff.
- Precipitation that falls within open excavations that has been segregated from the groundwater and not impacted by contaminated sideslopes will be sampled and analyzed for uranium as soon as possible so as to have results in hand prior to pumping from an excavation (i.e., attempt to sample and obtain results within 24 hrs of pumping).
- Precipitation that falls within an open excavation that has not been segregated from groundwater will be assumed contaminated and not meet offsite discharge criteria unless analyzed and shown otherwise or treated to MSD discharge criteria.

Groundwater collected in excavations is managed in one of the three following ways:

- If contaminant levels are within MSD permit limits, direct discharge will be made to the sewer system following required filtration.
- Temporary storage and treatment to reduce contaminant levels MSD influent criteria followed by discharge to the MSD sewer system.
- When the ground is less than saturated and the weather forecast does not predict precipitation (within 24 hr. period), water may be sprayed as dust control in controlled areas yet to be remediated. Spraying will be discontinued if runoff occurs or would be likely.

5.0 Excavation Water

Management of excavation water has the largest operational impact on the project schedule and therefore greatly impacts total project cost. During 2001 and 2002, information relating to the use of plastic liners in excavations, storage, spraying within the controlled area, and development of a more cost effective water treatment process was recorded. Based on the site specific information, management of excavation water is optimized by using all four methods depending on the time of year and status of excavation work.

5.1 Lining of Excavations

Large plastic (12 mil HDPE) liners provide segregation of ponded precipitation from contaminated soil and thereby reduce the amount of water which must be treated prior to discharge. However, the use of liners in undulating excavations is difficult and labor intensive. Liners shall be used to temporarily cover inactive excavations which have not proceeded below the water table.

5.2 Storage and Spraying of Excavation Water

Although storage of excavation water only delays the ultimate disposition of the water (i.e., treatment or spraying), storage in tanks and lined basins is a necessary method for managing excavation water due to the wide variation in seasonal precipitation and limitations of water treatment during cold weather. Furthermore, as removal work proceeds, spraying of excavation water becomes more limited and thereby requires greater emphasis on other water management methods including storage.

Stored quantities of water onsite have annually peaked between 1.2 to 1.9 million gallons. Peak storage quantities occur in late spring and into early summer. Roughly one-third to one-half of SLAPS peak water storage capacity can be contained by the three onsite circular (69.5 ft. diameter by 8 ft. tall) modular tanks having a total storage capacity of 630,000 gallons. In addition to the storage tanks, 375,000 to 500,000 gallon plastic lined basins have been used to store and biologically treat water. As site removal and backfill work continues, the location, number, and storage capacity of lined basins will be adjusted on a yearly basis. The location, number, and size of basins will be established during the winter months based on the amount of work to be performed for the following year.

Should the maximum storage capacity be exceeded, a special discharge shall be requested of MSD per Section III A., Item 7 of Application for Special Discharge Approval pursuant to

Ordinance 8472, Article 6, Section 4. With respect to Coldwater Creek, precautions will be taken to divert creek flow around the creek bed and Phases 4 and 5 excavations. However, creek water which inundates excavations in and adjacent to Coldwater Creek during high flows will be allowed to flow or be pumped back to the creek as the creek water level subsides.

Spraying of excavation water in unremediated controlled areas has greatly reduced the amount of water requiring treatment. The quantity of excavation water sprayed in a 12 month period was as high as 3.2 million gallons but has declined to 2.2 million gallons due to the decreasing area in which excavation water may be sprayed. The amount of water sprayed will continue to decline given the progressively smaller unremediated controlled area of the site in which excavation water may be sprayed. To replace the lost capacity to spray water, a supplemental water treatment system to the biological treatment process is being constructed and will be operational in the early summer of 2004.

5.3 Water Treatment

The planned SLAPS water treatment process is based on November 2002 bench testing and subsequent pilot and full scale testing. The existing biological treatment process which successfully removes contaminant concentrations in excavation water to MSD influent criteria will be supplemented with a copper-iron reduction co-precipitation process. The supplemental copper-iron reduction co-precipitation process will accelerate the overall excavation water treatment throughput.

The combined approach of storing, treating, and spraying excavation water will address the estimated yearly maximum generation of 2.2 million gallons of excavation water (S&W 2001c). Because the entire 2.2 million gallons can be treated and sprayed during the warmer months, the additional cost of making the treatment system functional throughout the year (i.e., heat trace and insulate and heat the water to allow biotreatment) is not justified. Figure 2 is a general process flow diagram of the process being pursued to treat SLAPS excavation water.

Water treatment documents inclusive of equipment information, operational and maintenance manual, and operating procedures will be developed as the water treatment system is constructed and commissioned in the spring and early summer of 2004.

6.0 References

Stone & Webster, Inc. (S&W), 2001a. *Site Grading and Drainage Plan*, FUSRAP St. Louis Airport Site, Rev. 0, October 22, 2001.

Stone & Webster, Inc. (S&W), 2001b. Calculation No. 08603-KC01-157, Maximum Stormwater Flow to Outfall 3 for Final Grading Following Removal Action at SLAPS, July 10, 2001.

Stone & Webster, Inc. (S&W), 2001c. Calculation No. 08603-KC01-158, Range of Excavation Water per Year Requiring Treatment, July 2, 2001, provided to USACE under submittal SLAPS-0256, July 16, 2001.

Metropolitan St. Louis Sewer District, (MSD) 2001. Letter from Mr. Bruce Litzsinger to Ms. Sharon Cotner, July 23, 2001.

Missouri Department of Natural Resources, (MDNR) 1998. Letter from Philip A. Schroeder to Ms. Sharon Cotner, October 2, 1998.

Missouri Department of Natural Resources (MDNR) 2002. Letter from Matthew Sikes to Ms. Sharon Cotner, February 19, 2002.

Table 1
SLAPS NPDES Permit Equivalent Discharge Limits to Coldwater Creek

Parameter	Units	Daily Maximum	Monthly Average	Measurement Frequency	Sample Type
Outfalls #001 - #003 Flow	MGD	See Note 1	-	Once/month	24 hr estimate
Oil and Grease	mg/L	15	10	Once/month	Grab
Total Petroleum Hydrocarbons	mg/L	10	10	Once/month	Grab
pH – Units	SU	6.0 to 9.0	See Note 2	Once/month	Grab
Chemical Oxygen Demand	mg/L	120	90	Once/month	Grab
Settleable Solids	ML/L/hr	1.5	1	Once/month	Grab
Arsenic, Total Recoverable	µg/L	100	100	Once/month	Grab
Lead, Total Recoverable	µg/L	190	190	Once/month	Grab
Chromium, Total Recoverable	µg/L	280	280	Once/month	Grab
Uranium, Total	µg/L	See Note 1		Once/month	Grab
	pCi/L			Per Event	Grag
Copper, Total Recoverable	µg/L	84	84	Once/month	Grab
Radium, Total	µg/L	See Note 1		Once/month	Grab
	pCi/L			Per Event	Grab
Cadmium, Total Recoverable	µg/L	94	94	Once/month	Grab
Thorium, Total	ug/L	See Note 1		Once/month	Grab
	pCi/L			Per Event	Grab
Polychlorinated Biphenyls	µg/L	See Note 3		Once/month	Grab
Gross Alpha	Activity	See Note 1		Per Event	Grab
Gross Beta	Activity	See Note 1		Per Event	Grab
Protactinium-231	pCi/L	See Note 1		Per Event	Grab
Actinium-227	pCi/L	See Note 1		Per Event	Grab
Radon	pCi/L	See Note 1		Twice/Year	Grab

Notes:
[1] Monitoring requirement only. The allowable level of discharge was not specified.
[2]. pH is measured in standard units and is not to be averaged.
[3] There shall be no release of PCBs at or above the level of quantification, currently defined as 0.5 ug/l (0.5 ppb).
* Note: Outfall 002 is monitored annually for any/all limitations.

Table 2
SLAPS Surface Water 10 CFR 20 App. B, Table 2 Discharge Criteria

Parameter	Units	Daily Maximum	Annual Average	Reference
Radionuclides				
Gross Alpha	pCi/L	See Note 1	NA	10CSR60-4.060 (See Note 1)
Gross Beta	pCi/L	See Note 1	NA	
Ra-226 & Ra-228, Combined	pCi/L	See Note 1	NA	10CSR60-4.060 (See Note 1)
		NA		
Radium-226	pCi/L	NA	60	10 CFR 20, App B, Table 2 (Surface Water) (See Note 2)
Radium-228	pCi/L	NA	60	10 CFR 20, App B, Table 2 (Surface Water) (See Note 2)
Actinium-227	pCi/L	NA	5	10 CFR 20, App B, Table 2 (Surface Water) (See Note 2)
Protactinium-231	pCi/L	NA	6	10 CFR 20, App B, Table 2 (Surface Water) (See Note 2)
Thorium-230	pCi/L	NA	100	10 CFR 20, App B, Table 2 (Surface Water) (See Note 2)
Thorium-232	pCi/L	NA	30	10 CFR 20, App B, Table 2 (Surface Water) (See Note 2)
Uranium-234	pCi/L	NA	300	10 CFR 20, App B, Table 2 (Surface Water) (See Note 2)
Uranium-235	pCi/L	NA	300	10 CFR 20, App B, Table 2 (Surface Water) (See Note 2)
Uranium-238	pCi/L	NA	300	10 CFR 20, App B, Table 2 (Surface Water) (See Note 2)

Notes:
[1] Limits for gross alpha, radium-226 & radium-228 are Manimum Contaminant Levels for the intake point of a public drinking water supply system, not discharge limits for SLAPS outfalls.
[2] The annual average activity intake concentration under 10 CFR 20 are for effluent to surface waters.

Table 3
SLAPS MSD Influent Discharge Criteria*

Contaminant	Influent Limit	Units
Uranium - 234	3000	pCi/l
Uranium - 235	3000	pCi/l
Uranium - 238	3000	pCi/l
Thorium - 228	2000	pCi/l
Thorium - 230	1000	pCi/l
Radium - 226	10	pCi/l
Radium - 228	30	pCi/l
Gross Alpha	3000	pCi/l
Barium	10.0	mg/l
Lead	0.4	mg/l
Selenium	0.2	mg/l

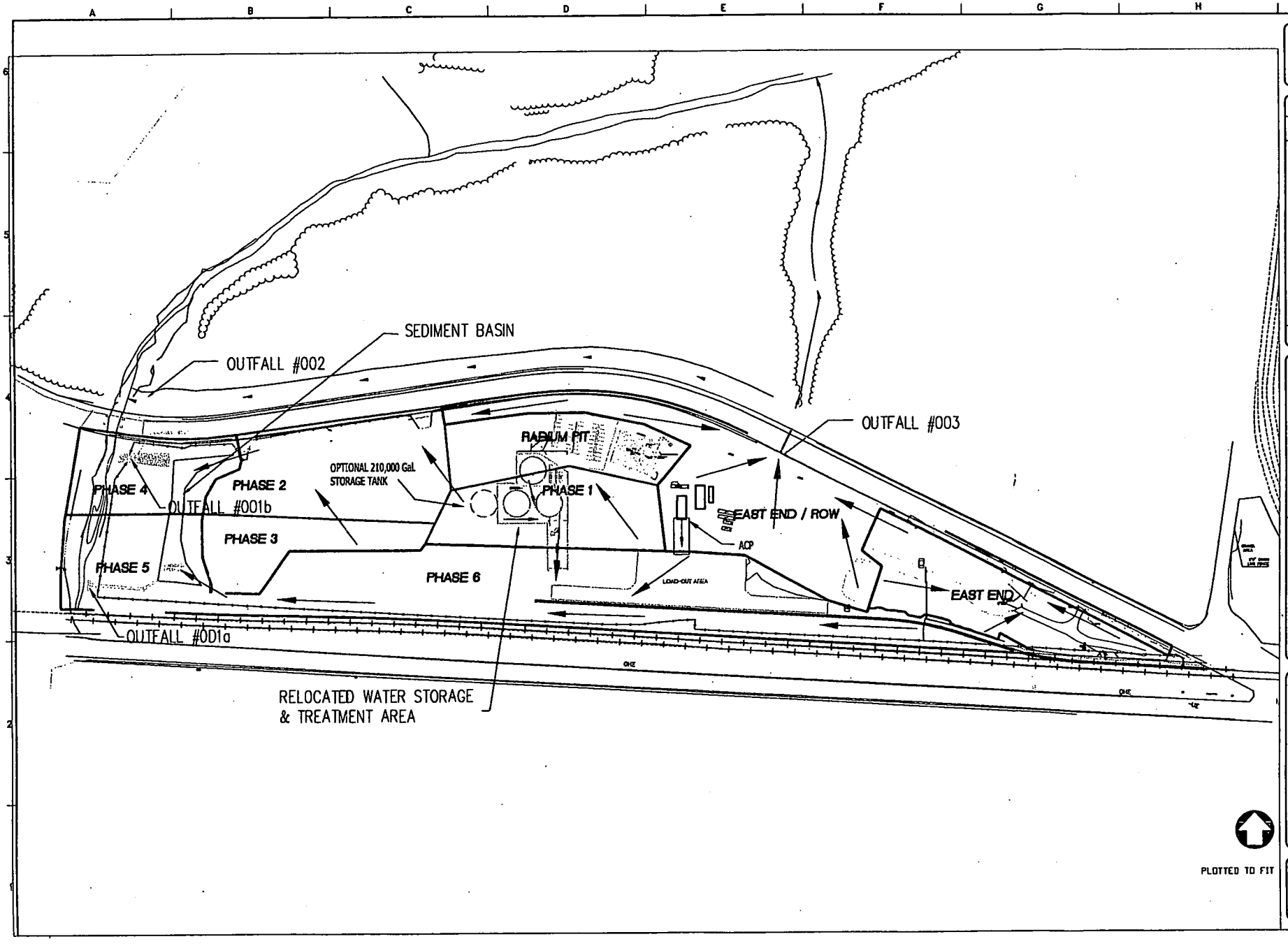
* Refer to MSD July 23, 2001 letter from Bruce Litzsinger to Ms. Sharon Cotner with discharge criteria and conditions in addition to Table 3

Table 4
ARARs Pertaining to Water Management at SLAPS

Standard, Criteria, Requirement, or Limitation and Citation	Description of Requirement	Document	Requirements
State NPDES Regulations 10 CSR §20-6.010	Waste water or other water discharged from a point source into waters of the state must meet permit limits.	FS*	Discharges to Coldwater Creek must be monitored and reported to the Missouri DNR in accordance with the discharge limits, sampling, and monitoring requirements specified in the October 1998 letter.
State Storm Water Regulations 10 CSR §20-6.200	Surface water run-off and erosion control during on-site activities.	FS EECA	Best management practices are required to control releases to surface waters of the state.
Water Quality Standards for Metals in Coldwater Creek 10 CSR 20-7.031(3) and (4)	Water contaminants must not cause or contribute to exceedences of values in Tables A and B of the Rule	FS EECA	For toxic substances, metals need to be analyzed for dissolved or total metals.
Water Quality Standards for Radionuclides 10 CSR 20-7.031(4)(1)	Streams shall conform to limits for radionuclides in drinking water supply.	FS EECA	Discharges into the Mississippi River cannot cause the level of radionuclides in the River to exceed limits established for drinking water supply.
Primary Drinking Water Standards – MCLs 10 CSR 60-4.060	The MCL for Ra-226 and Ra-228 is: Combining Ra-226 and Ra-228. 5pCi/L Gross alpha activity including Ra-226, but excluding radon and uranium = 15pCi/L	FS EECA	Discharges into the Mississippi River cannot cause the level of radionuclides in the River to exceed these limits.
Surface Water Limits 10 CFR 20 Appendix B, Table 2	Radiological discharge limits to creeks and publicly owned water treatment systems.	July 23, 2001 Discharge Criteria Letter	Discharge to Coldwater Creek and the MSD sewer system can not be greater than these limits.
Clean Water Act 40 CFR §§ 440.32(b) and 440.34(a)	Discharge of pollutants from mines must meet following limits <10pCi/L of dissolved Ra-226 in any one day or <3pCi/L averaged over 30 consecutive days <30 pCi/L of total Ra-226 in any one day of 10pCi/L averaged over 30 consecutive days 4 mg/L of U in any one day or 2mg/L averaged over 30 consecutive days.	EECA	These limits reflect best practicable control technology and can be used as guidelines for radioactivity to be discharged into surface or ground water.
Metropolitan St. Louis Sewer District (MSD)	Radiological, metals, nitrate, pH, ...	July 23, 2001 Discharge Criteria Letter	Discharge of treated SLAPS water to the MSD sewer system.

* Feasibility Study for the St. Louis North County Site, U.S. Army Corps of Engineers – St. Louis District Office, Final, May 1, 2003

FIGURES



U.S. Army Corps of Engineers
ST. LOUIS DISTRICT

STONE & YOUNGBERG ENVIRONMENTAL TECHNOLOGY & SERVICES

U.S. ARMY ENGINEER DIVISION
CORPS OF ENGINEERS
ST. LOUIS, MISSOURI

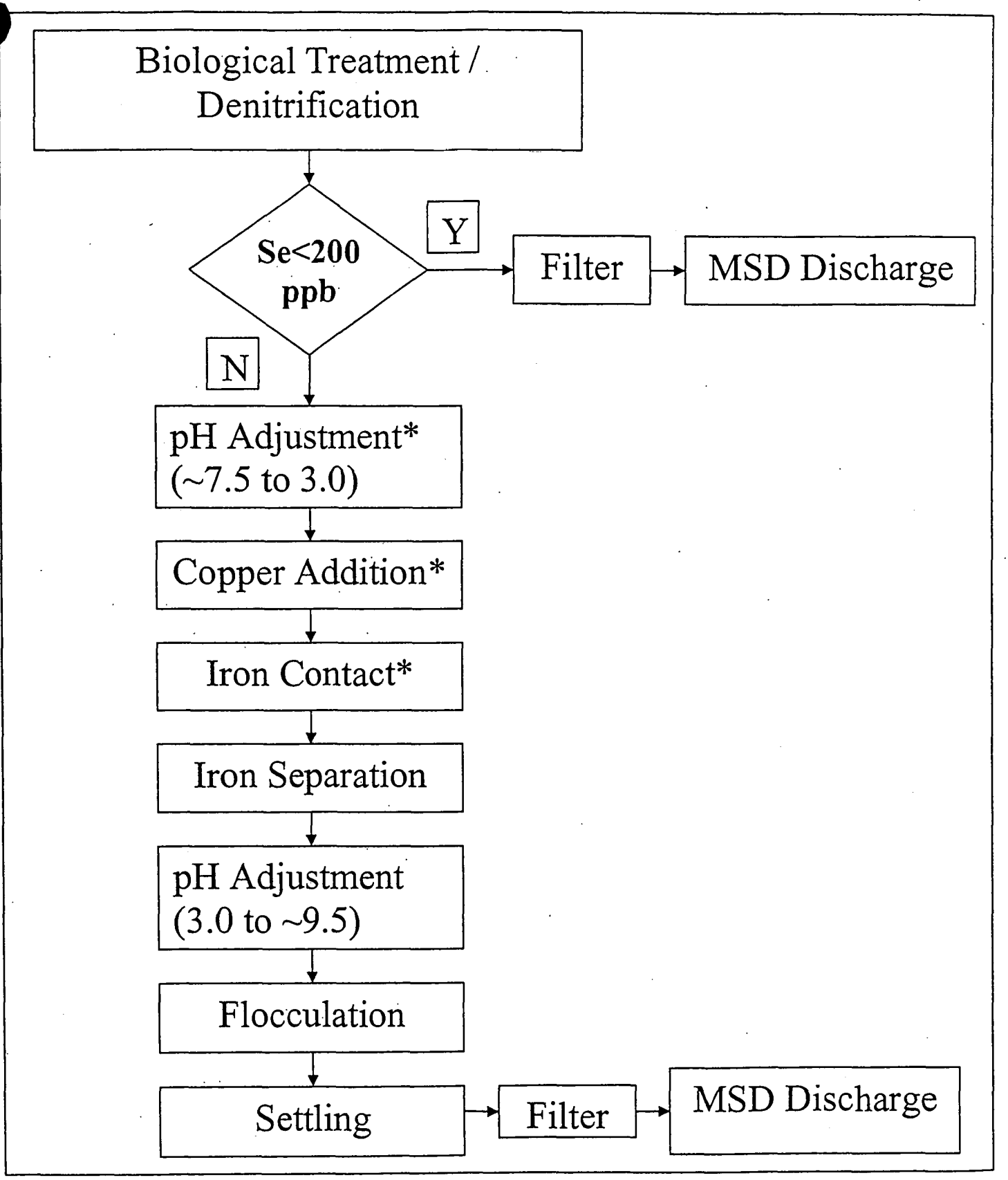
FUSRAP

ST. LOUIS AIRPORT SITE
ST. LOUIS, MISSOURI

SLAPS WATER MANAGEMENT FEATURES

FIG-01

Figure 2: SLAPS Planned Water Treatment Process



* Includes re-use of Arrakis components

Appendix

Quarterly and Annual Isotopic Concentrations at SLAPS Outfall 001a

1st Quarter 2003

Off-Site Annual Average Discharge Limit (pCi/L)				300	40	60	100	200	30		TOTAL URANIUM	TOTAL RADIUM	TOTAL THORIUM	GROSS ALPHA	GROSS BETA	Pa-231	Ac-227
SAMPLE DATE	SAMPLE ID	SAMPLE LOCATION	Flow (gallons)	Total Uranium (pCi/L)	Ra-226 (pCi/L)	Ra-228 (pCi/L)	Th-230 (pCi/L)	Th-228 (pCi/L)	Th-232 (pCi/L)	SOR	(µg/L)	(µg/L)	(µg/L)	(pCi/L)	(pCi/L)	(pCi/L)	(pCi/L)
		STONE & WEBSTER															
EVENT 1																	
1/8/2003	SLA73151NI	NPDES Outfall 001A	23700	1.9E+02	2.E+00	1.E+00	2.E+00	1.E+00	6.E-01	0.73	2.8E+02	2.E-06	6.E+00	1.9E+02	4.E+01	3.E-02	3.E-02
1/8/2003	SLA73152NF	NPDES Outfall 001A	7900	1.5E+02	2.E+00	9.E-01	2.E+00	9.E-01	5.E-01	0.61	2.3E+02	2.E-06	5.E+00	1.8E+02	4.E+01	4.E-02	4.E-02
001A Flow weighted average of activity concentration or mass concentration				1.8E+02	2.E+00	1.E+00	2.E+00	1.E+00	6.E-01	7.0E-01	2.6E+02	2.E-06	5.E+00	1.9E+02	4.E+01	3.E-02	3.E-02
EVENT 2																	
2/14/2003	SLA73153NI	NPDES Outfall 001A	17000	2.2E+02	4.E+00	6.E-01	3.E+00	6.E-01	8.E-01	0.88	3.3E+02	4.E-06	7.E+00	2.2E+02	5.E+01	5.E-02	5.E-02
2/15/2003	SLA73154ND	NPDES Outfall 001A	17100	1.8E+02	2.E+00	2.E+00	5.E+00	2.E+00	2.E-01	0.74	2.7E+02	2.E-06	2.E+00	3.7E+02	6.E+01	7.E-02	7.E-02
2/15/2003	SLA73155NF	NPDES Outfall 001A	5700	2.5E+02	1.E+00	4.E+00	6.E+00	4.E+00	1.E-01	0.98	3.8E+02	1.E-06	1.E+00	4.5E+02	4.E+01	1.E-01	1.E-01
001A Flow weighted average of activity concentration or mass concentration				2.1E+02	3.E+00	2.E+00	4.E+00	2.E+00	4.E-01	8.3E-01	3.1E+02	3.E-06	4.E+00	3.2E+02	5.E+01	7.E-02	7.E-02
EVENT 3																	
2/19/2003	SLA73156NI	NPDES Outfall 001A	91100	1.5E+02	5.E+00	2.E-01	2.0E+00	2.E-01	3.E-01	0.62	2.2E+02	5.E-06	3.E+00	2.1E+02	4.E+00	3.E-02	3.E-02
2/20/2003	SLA73158ND	NPDES Outfall 001A	79400	1.0E+02	4.E+00	2.E+00	2.9E+00	2.E+00	5.E-01	0.49	1.5E+02	4.E-06	5.E+00	1.8E+02	5.E+01	4.E-02	4.E-02
2/21/2003	SLA73159NF	NPDES Outfall 001A	26500	5.8E+01	2.E+00	2.E+00	3.E+00	2.E+00	3.E-01	0.32	8.5E+01	2.E-06	3.E+00	1.3E+02	3.E+01	5.E-02	5.E-02
001A Flow weighted average of activity concentration or mass concentration				1.2E+02	4.E+00	1.E+00	3.E+00	1.E+00	4.E-01	5.3E-01	1.8E+02	4.E-06	4.E+00	1.9E+02	2.E+01	4.E-02	4.E-02
EVENT 4																	
3/13/2003	SLA73160NI	NPDES Outfall 001A	65790	5.2E+01	4.E+00	2.E+00	1.1E+01	2.E+00	0.E+00	0.39	7.7E+01	4.E-06	8.E-04	1.1E+02	3.E+01	1.7E-01	1.7E-01
3/14/2003	SLA73161NF	NPDES Outfall 001A	18890	7.8E+01	2.E+00	2.E+00	5.E+00	2.E+00	8.E-01	0.40	1.1E+02	2.E-06	7.E+00	9.7E+01	4.E+01	8.E-02	8.E-02
001A Flow weighted average of activity concentration or mass concentration				5.8E+01	3.E+00	2.E+00	1.E+01	2.E+00	2.E-01	3.9E-01	8.6E+01	3.E-06	2.E+00	1.0E+02	3.E+01	1.E-01	1.E-01
EVENT 5																	
3/19/2003	SLA73162NI	NPDES Outfall 001A	77580	8.9E+01	3.E+00	1.E+00	9.E+00	1.E+00	2.E-01	0.47	1.3E+02	4.E-06	1.E+00	1.2E+02	2.E+01	1.E-01	1.E-01
3/20/2003	SLA73163ND	NPDES Outfall 001A	81380	1.1E+02						0.37	1.7E+02						
3/21/2003	SLA73164ND	NPDES Outfall 001A	46380	1.5E+02						0.51	2.3E+02						
3/21/2003	SLA73165NF	NPDES Outfall 001A	15580	1.2E+02	2.E+00	1.E-01	3.E+00	1.4E-01	1.E-01	0.46	1.8E+02	2.E-06	1.E+00	1.7E+02	4.E+01	5.E-02	5.E-02
3/21/2003	SLA73166NC	NPDES Outfall 001A	127600		1.E+00	9.E-01	5.E+00	8.7E-01	0.E+00	0.09		1.E-06	3.E-04	1.5E+02	4.E+01	6.E-02	6.E-02
001A Flow weighted average of activity concentration or mass concentration				1.1E+02	2.E+00	9.E-01	6.E+00	4.E-01	6.E-02	5.0E-01	1.7E+02	2.E-06	6.E-01	1.4E+02	4.E+01	1.E-01	1.E-01

Sum of Ratios = (U238/300)+(U235/300)+(U234/300)+(Ra226/60)+(Ra228/60)+(Th230/100)+(Th-228/200)+(Th232/30)
Activities reported represent alpha spec results

2nd Quarter 2003

SAMPLE DATE	SAMPLE ID	SAMPLE LOCATION	Flow (gallons)	Total Uranium (pCi/L)	Ra-226 (pCi/L)	Ra-228 (pCi/L)	Th-230 (pCi/L)	Th-228 (pCi/L)	Th-232 (pCi/L)	SOR	TOTAL URANIUM (µg/L)	TOTAL RADIUM (µg/L)	TOTAL THORIUM (µg/L)	GROSS ALPHA (pCi/L)	GROSS BETA (pCi/L)	Pa-231 (pCi/L)	Ac-227 (pCi/L)
Off-Site Annual Average Discharge Limit (pCi/L)				300	60	60	100	200	30								
		STONE & WEBSTER															
EVENT 1																	
4/16/2003	SLA73167NI	NPDES Outfall 001A	93700	2.5E+01	2.E+00	2.E+00	8.E+00	2.E+00	9.E-01	0.28	3.7E+01	2.E-06	8.E+00	6.9E+01	4.8E+01	1.2E-01	1.2E-01
4/17/2003	SLA73169ND	NPDES Outfall 001A	80700	7.3E+01						0.24	1.1E+02						
4/18/2003	SLA73170NF	NPDES Outfall 001A	26900	4.0E+01	1.E+00	3.E+00	4.E+00	3.E+00	3.E-01	0.27	5.9E+01	1.E-06	2.E+00	6.3E+01	6.4E+01	6.E-02	6.E-02
001A Flow weighted averega of activity concentration or mass concentration				4.6E+01	2.E+00	3.E+00	7.E+00	3.E+00	7.E-01	3.3E-01	6.8E+01	2.E-06	7.E+00	6.8E+01	5.1E+01	1.E-01	1.E-01
4/17/2003	SLA73166NI	NPDES Outfall 002	10600	1.6E-01	7.E-01	6.E-01	3.E+00	6.E-01	7.E-01	0.08	2.3E-01	7.E-07	6.E+00	3.E+00	5.E+01	5.E-02	5.E-02
002 Flow weighted average of activity concentration or mass concentration				1.6E-01	6.6E-01	7.8E-01	3.1E+00	7.8E-01	6.9E-01	8.2E-02	2.3E-01	6.7E-07	6.3E+00	3.E+00	4.9E+01	4.7E-02	4.7E-02
EVENT 2																	
4/24/2003	SLA73171NI	NPDES Outfall 001A	184000	4.5E+01	5.E+00	8.E-01	2.E+00	8.E-01	6.E-01	0.30	6.7E+01	5.E-06	6.E+00	8.5E+01	4.5E+01	4.E-02	4.E-02
4/24/2003	SLA73172NF	NPDES Outfall 001A	81200	5.5E+01	1.E+00	2.E+00	5.E+00	2.E+00	0.E+00	0.26	8.1E+01	1.E-06	2.E-04	7.7E+01	7.1E+01	7.E-02	7.E-02
001A Flow weighted average of activity concentration or mass concentration				4.8E+01	4.E+00	1.E+00	3.E+00	1.E+00	5.E-01	3.0E-01	7.1E+01	4.E-06	4.E+00	8.3E+01	5.2E+01	4.E-02	4.E-02
EVENT 3																	
4/29/2003	SLA73173NI	NPDES Outfall 001A	57400	1.1E+02	2.E+00	1.E+00	3.E+00	1.E+00	4.E-02	0.46	1.7E+02	2.E-06	4.E-01	9.E+01	4.2E+01	4.E-02	4.E-02
4/30/2003	SLA73174ND	NPDES Outfall 001A	107000	7.4E+01						0.25	1.1E+02						
4/30/2003	SLA73175NF	NPDES Outfall 001A	35500	1.4E+02	3.E+00	1.E+00	3.E+00	1.E+00	3.E-01	0.59	2.1E+02	3.E-06	3.E+00	1.7E+02	5.1E+01	5.E-02	5.E-02
001A Flow weighted average of activity concentration or mass concentration				9.7E+01	2.E+00	1.E+00	3.E+00	1.E+00	1.E-01	4.2E-01	1.4E+02	2.E-06	1.E+00	1.E+02	4.5E+01	4.E-02	4.E-02
EVENT 4																	
5/4/2003	SLA73176NI	NPDES Outfall 001A	118000	8.8E+01	2.E-01	9.E-01	1.E+01	9.E-01	5.E-01	0.39	1.0E+02	2.E-07	5.E+00	8.5E+01	8.6E+01	1.8E-01	1.8E-01
5/5/2003	SLA73177NF	NPDES Outfall 001A	39200	1.2E+02	2.E+00	2.E-01	3.E+00	2.E-01	6.E-01	0.50	1.8E+02	2.E-06	8.E+00	1.9E+02	1.E+02	4.E-02	4.E-02
001A Flow weighted average of activity concentration or mass concentration				8.2E+01	7.E-01	7.E-01	1.E+01	7.E-01	5.E-01	4.1E-01	1.2E+02	7.E-07	5.E+00	1.1E+02	7.E+01	1.E-01	1.E-01
EVENT 5																	
5/7/2003	SLA73178NI	NPDES Outfall 001A	237000	9.6E+01	4.E+00	2.E+00	3.E+00	2.E+00	1.E-01	0.45	1.4E+02	4.E-06	1.E+00	1.5E+02	1.E+02	4.E-02	4.E-02
5/6/2003	SLA73179NF	NPDES Outfall 001A	79000	1.6E+02	3.E+00	1.E+00	1.E+01	1.E+00	4.E-01	0.84	2.7E+02	3.E-06	3.E+00	2.2E+02	1.5E+02	2.2E-01	2.2E-01
001A Flow weighted average of activity concentration or mass concentration				1.2E+02	4.E+00	2.E+00	5.E+00	2.E+00	2.E-01	5.5E-01	1.7E+02	4.E-06	2.E+00	1.7E+02	1.E+02	8.E-02	8.E-02
EVENT 6																	
5/10/2003	SLA73180NI	NPDES Outfall 001A	181000	8.5E+01	4.E+00	6.E-01	9.E+00	6.E-01	6.E-01	0.47	1.3E+02	4.E-06	5.E+00	1.0E+02	6.5E+01	1.3E-01	1.3E-01
5/11/2003	SLA73181ND	NPDES Outfall 001A	181000	1.6E+02						0.55	2.4E+02						
5/12/2003	SLA73182ND	NPDES Outfall 001A	187000	1.2E+02						0.41	1.8E+02						
5/12/2003	SLA73183NF	NPDES Outfall 001A	55700	1.6E+02	4.E+00	2.E+00	8.E+00	2.0E+00	3.E-01	0.71	2.3E+02	4.E-06	3.E+00	1.6E+02	1.2E+02	1.2E-01	1.2E-01
5/12/2003	SLA73184NC	NPDES Outfall 001A	348000		2.E+00	1.E+00	1.E+01	1.0E+00	4.E-01	0.18		2.E-08	4.E+00	1.7E+02	1.3E+02	1.5E-01	1.5E-01
001A Flow weighted average of activity concentration or mass concentration				1.3E+02	2.E+00	1.E+00	9.E+00	4.E-01	4.E-01	5.9E-01	1.9E+02	2.E-06	4.E+00	1.5E+02	1.1E+02	1.4E-01	1.4E-01
EVENT 7																	
5/25/2003	SLA73185NF	NPDES Outfall 001A	22900	4.E+01	1.E+00	1.E+00	8.E+00	1.4E+00	4.E-01	0.29	8.6E+01	1.E-06	4.E+00	9.E+01	5.E+01	1.E-01	1.E-01
001A Flow weighted average of activity concentration or mass concentration				4.E+01	1.2E+00	1.4E+00	7.5E+00	1.4E+00	4.4E-01	2.9E-01	6.6E+01	1.2E-06	4.0E+00	9.E+01	5.E+01	1.2E-01	1.2E-01
EVENT 8																	
6/2/2003	SLA73186NI	NPDES Outfall 001A	28400	8.E+01	2.E+00	8.E-01	6.E+00	8.4E-01	3.E-01	0.41	1.2E+02	2.E-06	3.E+00	2.E+02	6.E+01	1.0E-01	1.0E-01
6/3/2003	SLA73187NF	NPDES Outfall 001A	9500	9.E+01	2.E+00	1.E+00	2.E+00	1.4E+00	1.E+00	0.42	1.3E+02	2.E-06	1.E+01	2.E+02	1.E+02		
001A Flow weighted average of activity concentration or mass concentration				9.E+01	2.E+00	1.E+00	5.E+00	1.E+00	5.E-01	4.1E-01	1.3E+02	2.E-06	5.E+00	2.E+02	7.E+01	1.0E-01	1.0E-01
EVENT 9																	
6/6/2003	SLA73188NI	NPDES Outfall 001A	9600	5.6E+01	4.E+00	8.E+00	1.E+01	8.E+00	2.E+00	0.81	6.6E+01	4.E-06	2.E+01	2.E+02	9.E+01	2.E-01	2.E-01
6/7/2003	SLA73189NF	NPDES Outfall 001A	3300	7.9E+01	6.E+00	1.E+00	1.E+01	1.E+00	1.E+00	0.54	1.2E+02	8.E-06	1.E+01	2.E+02	9.E+01	2.E-01	2.E-01
001A Flow weighted average of activity concentration or mass concentration				6.3E+01	5.E+00	6.E+00	1.E+01	6.E+00	2.E+00	5.9E-01	9.4E+01	5.E-06	2.E+01	2.E+02	9.E+01	2.E-01	2.E-01
EVENT 10																	
6/10/2003	SLA73190NI	NPDES Outfall 001A	165000	9.E+01	4.E+00	3.E-01	8.E+00	3.3E-01	4.E-01	0.48	1.3E+02	4.E-06	4.E+00	1.E+02	5.E+01	1.E-01	1.E-01
6/11/2003	SLA73191ND	NPDES Outfall 001A	833000	5.E+01						0.15	8.7E+01						
6/12/2003	SLA73193ND	NPDES Outfall 001A	848000	5.3E+01						0.18	7.6E+01						
6/13/2003	SLA73194ND	NPDES Outfall 001A	318000	1.0E+02						0.34	1.5E+02						
6/13/2003	SLA73195NF	NPDES Outfall 001A	139000	1.2E+02	2.E+00	3.E+00	1.3E+01	2.6E+00	1.E+00	0.67	1.8E+02	2.E-06	1.E+01	1.2E+02	9.E+01	2.1E-01	2.1E-01
6/14/2003	SLA73196NC	NPDES Outfall 001A	1789000		7.E-01	3.E+00	9.E+00	2.6E+00	5.E-01	0.18		7.E-07	5.E+00	1.5E+02	8.E+01	1.4E-01	1.4E-01
001A Flow weighted average of activity concentration or mass concentration				6.E+01	1.1E+00	2.4E+00	9.4E+00	2.4E+00	5.5E-01	4.0E-01	9.5E+01	1.1E-06	5.1E+00	1.E+02	8.2E+01	1.E-01	1.E-01

Site Annual Average Discharge Limit (pCi/L)				300	60	60	100	200	30								
SAMPLE DATE	SAMPLE ID	SAMPLE LOCATION	Flow (gallons)	Total Uranium (pCi/L)	Ra-226 (pCi/L)	Ra-228 (pCi/L)	Th-230 (pCi/L)	Th-228 (pCi/L)	Th-232 (pCi/L)	SOR	TOTAL URANIUM (µg/L)	TOTAL RADIUM (µg/L)	TOTAL THORIUM (µg/L)	GROSS ALPHA (pCi/L)	GROSS BETA (pCi/L)	Pa-231 (pCi/L)	Ac-227 (pCi/L)
EVENT 11																	
6/19/2003	SLA73197NI	NPDES Outfall 001A	33800	3.7E+02	8.E+00	2.E+00	1.6E+01	2.E+00	1.E+00	1.58	5.5E+02	8.E-08	1.E+01	2.6E+02	1.8E+02	2.5E-01	2.5E-01
6/19/2003	SLA73198NF	NPDES Outfall 001A	11300	2.1E+02	6.E+00	3.E+00	1.6E+01	3.E+00	1.E+00	1.06	3.0E+02	6.E-08	1.E+01	1.5E+02	9.E+01	2.5E-01	2.5E-01
1A Flow weighted average of activity concentration or mass concentration				3.3E+02	6.E+00	2.E+00	1.6E+01	2.E+00	1.E+00	1.4E+00	4.9E+02	6.E-08	1.E+01	2.5E+02	2.E+02	2.5E-01	2.5E-01
EVENT 12																	
6/25/2003	SLA73199NI	NPDES Outfall 001A	530400	3.9E+01	3.E+00	2.E+00	2.7E+01	2.E+00	1.E+00	0.53	5.7E+01	3.E-08	1.E+01	1.1E+02	8.E+01	4.E-01	4.E-01
6/26/2003	SLA73200ND	NPDES Outfall 001A	206900	8.4E+01						0.21	9.5E+01						
6/27/2003	SLA73201ND	NPDES Outfall 001A	143500	2.1E+02						0.71	3.2E+02						
6/28/2003	SLA73202ND	NPDES Outfall 001A	66300	1.7E+02						0.57	2.5E+02						
6/28/2003	SLA73203NF	NPDES Outfall 001A	22100	1.8E+02	8.E-01	2.E+00	2.E+00	1.7E+00	4.E-01	0.66	2.6E+02	7.E-07	4.E+00	1.4E+02	2.6E+01	3.4E-02	3.4E-02
8/28/2003	SLA73204NC	NPDES Outfall 001A	416700		5.E-01	4.E-01	2.E+00	3.8E-01	1.E+00	0.07		5.E-07	9.E+00	1.2E+02	2.8E+01	3.5E-02	3.5E-02
1A Flow weighted average of activity concentration or mass concentration				8.2E+01	2.E+00	1.E+00	1.E+01	1.E+00	6.E-01	5.0E-01	1.2E+02	1.9E-06	5.5E+00	6.5E+01	3.1E+01	2.2E-01	2.2E-01

Notes:

) Sum of Ratios = (U238/300)+(U235/300)+(U234/300)+(Ra226/60)+(Ra228/60)+(Th230/100)+(Th-228/200)+(Th232/30)

2) Activities reported represent alpha spec results

3) Results other than TotU for daily samples (ND) are not required for this report. While data may have been provided for other analyses, it is not intended to be part of this representation.

3rd Quarter 2003

Off-Site Annual Average Discharge Limit (pCi/L)				300	60	60	100	200	30								
SAMPLE DATE	SAMPLE ID	SAMPLE LOCATION	Flow (gallons)	Total Uranium (pCi/L)	Ra-226 (pCi/L)	Ra-228 (pCi/L)	Th-230 (pCi/L)	Th-228 (pCi/L)	Th-232 (pCi/L)	SOR	TOTAL URANIUM (µg/L)	TOTAL RADIUM (µg/L)	TOTAL THORIUM (µg/L)	GROSS ALPHA (pCi/L)	GROSS BETA (pCi/L)	Pa-231 (pCi/L)	Ac-227 (pCi/L)
		STONE & WEBSTER															
EVENT 1																	
7/10/2003	SLA73208NI	NPDES Outfall 001A	85600	1.30E+02	4.E+00	0.E+00	3.E+01	0.E+00	2.E-01	0.78	1.92E+02	4.E-06	2.E+00	1.1E+02	8.6E+01	4.3E-01	4.3E-01
7/10/2003	SLA73209NF	NPDES Outfall 001A	28500	1.31E+02	2.E+00	4.E-01	4.E+00	4.E-01	1.E-01	0.52	1.94E+02	2.E-06	1.E+00	1.3E+02	5.7E+01	5.8E-02	5.6E-02
001A Flow weighted average of activity concentration or mass concentration				1.31E+02	3.E+00	1.E-01	2.E+01	1.E-01	2.E-01	7.2E-01	1.93E+02	3.E-06	2.E+00	1.2E+02	8E+01	3.E-01	3.E-01
EVENT 2																	
7/18/2003	SLA73210NI	NPDES Outfall 001A	29500	2.6E+02	3.E+00	6.E-01	6.E-01	8.E-01	0.E+00	0.94	3.9E+02	3.E-06	3.E-05	3.6E+02	1.E+02	9.E-03	9.E-03
7/19/2003	SLA73211ND	NPDES Outfall 001A	21200	2.5E+02						0.82	3.8E+02						
7/19/2003	SLA73212NF	NPDES Outfall 001A	7100	3.0E+02	4.E+00	8.E-01	1.E+00	6.E-01	5.E-01	1.12	4.5E+02	5.E-06	5.E+00	3.2E+02	1.E+02	2.E-02	2.E-02
001A Flow weighted average of activity concentration or mass concentration				2.6E+02	3.E+00	6.E-01	7.E-01	6.E-01	1.E-01	9.4E-01	3.9E+02	3.E-06	9.E-01	3.5E+02	1.3.E+02	1.E-02	1.E-02
EVENT 3																	
8/31/2003	SLA73213NI	NPDES Outfall 001A	74800	5.3E+01	2.E+00	1.E+00	9.E+00	1.E+00	4.E-01	0.33	7.6E+01	2.E-06	4.E+00	7.1E+01	2.E+01	1.E-01	1.E-01
9/1/2003	SLA73214ND	NPDES Outfall 001A	396800	5.0E+01						0.17	7.4E+01						
9/2/2003	SLA73215ND	NPDES Outfall 001A	128400	2.8E+01						0.09	3.9E+01						
9/3/2003	SLA73217ND	NPDES Outfall 001A	87900	5.6E+01						0.19	8.3E+01						
9/4/2003	SLA73220ND	NPDES Outfall 001A	50800	8.5E+01						0.28	1.3E+02						
9/4/2003	SLA73221NF	NPDES Outfall 001A	16900	8.0E+01	2.E+00	2.E+00	3.E+00	2.0E+00	5.E-01	0.31	6.8E+01	2.E-06	4.E+00	5.0E+01	3.E+01	5.E-02	5.E-02
9/4/2003	SLA73222NC	NPDES Outfall 001A	865900		2.E+00	5.E+00	7.E+00	4.7E+00	4.E-01	0.22		2.E-06	4.E+00	5.7E+01	3.E+01	1.E-01	1.E-01
001A Flow weighted average of activity concentration or mass concentration				5.0E+01	2E+00	4E+00	7E+00	4E+00	4E-01	3.8E-01	7.3E+01	2E-06	4E+00	5.8E+01	3.0E+01	1E-01	1E-01
9/2/2003	SLA73216NI	NPDES Outfall 001B	73500	5.0E-01	9.E-01	2.E+00	3.E+00	2.E+00	3.E-01	0.10	7.3E-01	1.E-06	3.E+00	4.8E-01	7.E+00	5.E-02	5.E-02
9/3/2003	SLA73218ND	NPDES Outfall 001B	149600	7.0E-01						0.00	1.0E+00						
9/3/2003	SLA73219NF	NPDES Outfall 001B	49900	8.7E-01	1.E+00	3.E+00	3.E+00	3.4E+00	4.E-01	0.14	9.9E-01	1.E-06	4.E+00	3.4E+00	7.E-01	5.E-02	5.E-02
001B Flow weighted average of activity concentration or mass concentration				6.4E-01	1.E+00	3.E+00	3.E+00	3.E+00	3.E-01	1.2E-01	9.5E-01	1.E-06	3.E+00	2E+00	4.E+00	5.E-02	5.E-02
EVENT 4																	
9/28/2003	SLA73223NI	NPDES Outfall 001A	75000	2.15E+02						0.72	3.16E+02						
9/27/2003	SLA73224NF	NPDES Outfall 001A	25000	1.99E+02						0.68	2.94E+02						
001A Flow weighted average of activity concentration or mass concentration				2.11E+02	0.E+00	0.E+00	0.E+00	0.E+00	0.E+00	7.0E-01	3.12E+02	0.E+00	0.E+00	0.0E+00	0.E+00	0.E+00	0.E+00
EVENT 13 (from 2nd Quarter 2003)																	
8/30/2003	SLA73205NI	NPDES Outfall 001A	145000	4.5E+01	3.E+00	1.E+00	3.4.E+01	1.E+00	4.E-01	0.56	6.8E+01	3.E-06	3.E+00	1.1E+02	8.E+01	5.E-01	5.E-01
7/1/2003	SLA73206ND	NPDES Outfall 001A	54000	1.0E+02						0.35	1.8E+02						
7/1/2003	SLA73207NF	NPDES Outfall 001A	16000	1.3E+02	2.E+00	2.E+00	1.1.E+01	2.E+00	1.E+00	0.66	1.9E+02	2.E-06	1.E+01	1.2E+02	2.E+01	2.E-01	2.E-01
001A Flow weighted average of activity concentration or mass concentration				6.6E+01	3.E+00	1.E+00	3.1.E+01	1.E+00	5.E-01	6.3E-01	9.8E+01	3.E-06	4.E+00	1.1E+02	7.E+01	5.E-01	5.E-01

Notes:

1) Sum of Ratios = (U238/300)+(U235/300)+(U234/300)+(Ra226/60)+(Ra228/60)+(Th230/100)+(Th-228/200)+(Th232/30)

2) Activities reported represent alpha spec results

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Further Info? ☐

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Subject or Title
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