UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

October 15, 2008

In Reply Refer To: WTR-7

Ted Leiato, Power Plant Manager
American Samoa Power Authority
P.O. Box PPB
Pago Pago, Tutuila, American Samoa 96799

Re: April 1, 2008 Clean Water Act Inspection

Dear Mr. Leiato:

Enclosed is the October 15th report for our April 1, 2008 inspection of the Satala Power Plant. Please submit a short response to the findings in Sections 1 through 3 of this report to EPA and ASEPA, by **November 30, 2008**. The main findings are summarized below:

1 The Satala Power Plant consistently complies with its NPDES permit limits for oil and grease, pH, lead, and nickel, but not for copper or zinc. The metals limits are the water quality standards themselves for the harbor applied end-of-pipe without adjustment, and as such they are not achievable strictly through treatment of storm water.

2 Compliance with the limits for conventional pollutants is reached through settling and oil skimming of low-strength drainage. Additional best management practices and pollution prevention practices are needed to control sources of copper and zinc. Contaminated groundwater seepages should be pretreated through a new first-stage oil water separator for discharge to the harbor through the existing sump as a second stage of treatment.

3 Sampling captures only storm water run-off and thus does not account for the process-related wastewaters generated irrespective of storm events. These process wastewaters include cooling tower spents, fuel tank farm wash, and truck wash down. Soapy process-related wastewater was found in the interceptor trench leading to the oil water separator.

4 The drainage lines from the secondary containments for the fuel tank farm, the waste oil tanks, and the transformer platform, all should be fitted and operated normally closed.

I appreciate your helpfulness and that of your staff to me during this inspection. We remain available to ASPA and the Territory of American Samoa to assist in any way. Please do not hesitate to call me at (415) 972-3504, or e-mail arthur.greg@epa.gov.

Sincerely,

Original signed by:

Greg V. Arthur
CWA Compliance Office

cc: Lt. Matt Vojik, ASEPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

REGION 9

CLEAN WATER ACT COMPLIANCE OFFICE

NPDES COMPLIANCE EVALUATION INSPECTION

NPDES Permittee:	American Samoa Power Authority
Facility:	Satala Power Plant P.O. Box PPB, Pago Pago, Tutuila Island, American Samoa (NPDES Permit No. AS0020044)
Receiving Water:	Pago Pago Harbor
Date of Inspection:	April 1, 2008

Inspection Participants:

US EPA:	Greg V. Arthur, CWA Compliance Office, (415) 972-3504
ASEPA:	LT Matt Vojic (USPHS), ASEPA Acting Dirctor (684) 633-2304
ASPA:	Ted Leiato, Power Generation Manager, (684) 252-2824 Siva Kumar, Technical Support, (684) 252-1436 Junior Lauvao, Operations Superintendent
Report Prepared By:	Greg V. Arthur, Environmental Engineer, USEPA Region 9
	October 15, 2008

1.0 Scope and Purpose

On April 1, 2008, EPA conducted an NPDES compliance evaluation inspection of the American Samoa Power Authority ("ASPA"), Satala Power Plant. The purpose was to ensure compliance with the NPDES permit and applicable Federal regulations covering the discharge of non-domestic wastewaters and storm water runoff into waters of the United States. A secondary purpose was also to identify and verify the conditions to be in future NPDES permits. In particular, it was to ensure:

- Classification in the proper Federal category;
- Application of the correct standards at the correct sampling points;
- Application of effective best management practices;
- Consistent compliance with the standards and best management practices; and
- Fulfillment of Federal self-monitoring requirements.

The Satala Power Plant is one of the dischargers of storm or industrial wastewater to waters of the United States whose compliance was assessed as part of evaluations of the NPDES permitted discharges in American Samoa conducted in the past year. Inspection participants are listed on the title page of this report. Arthur conducted the inspection on April 1st.

1.1 Background

The Satala Power Plant is a 25MWatt diesel electric power plant. Together the ASPA power plants at Satala and Tafuna interlink to provide power to Tutuila Island. The Satala Power Plant was built in 1959. Fuel arrives by tanker truck. See Sections 1.3 and 1.4 on pages 3 and 4 for further description of on-site processes.

On May 5, 2004, US EPA issued a revised NPDES permit No. AS0020044 to ASPA for discharges of storm water run-off from the Satala Power Plant to the harbor. Since 1992, industrial wastewater from COS Samoa and the other cannery have discharged together through the deep water Joint Cannery Outfall to the outer harbor, although each cannery holds an individual permit. The current permit became in effect on May 8, 2004 and is set to expire on May 7, 2009. The previous permit was issued on April 15, 1997. See Section 2.0 for further description of the permit requirements.

1.2 Facility SIC Code

The ASPA Satala Power Plant is assigned the SIC code for electric power generation, transmission, or distribution (SIC 4911).

1.3 Facility Description

The Satala Power Plant consists of a main building housing the administrative offices and the power plant room, a fuel tank farm, a waste oil tank containment area, a transformer

containment area, and a series of outdoor cooling towers. The facilities east of the fuel tank farm, previous identified as repair shops and warehousing and listed in the SPCC plans as part of the power plant, no longer are owned and operated by ASPA. The Satala Power Plant is sited on the north shore of the inner Pago Pago Harbor, west of the tuna canneries and the shipyard. See the photographic documentation of this inspection in Section 1.6 of this report.

Power Plant – The power plant employs four main engines, all installed since 1992, and each with a rated capacity of 4.57 MWatts. There are also four older and smaller engines on standby, two each with rated capacities 2.5 and 1.5 MWatts. The diesel engines are water-jacket cooled. The alternators are air cooled. The shaft bearings are oil cooled. Each engine is taken out of service for routine maintenance every six weeks. Each engine is also over-hauled once every three years with the machining work performed on-island at the ASPA Tafuna Power Plant.

Cooling Towers – Twelve individual cooling towers are used to water-jacket cool the engines. The cooling towers are located outside on the paved access road in front of the engine building between the highway and the building. ASPA does not add corrosion inhibitors or biocides to the cooling tower contents. Each cooling tower is drained every four months to the underlying cement pad. See Photo #1 in Section 1.6 on page 6.

Fuel Tank Farm – Two 24,000 gallon diesel tanks are installed behind concrete block secondary containment walls. The fuel tanks are power washed every three weeks. Storm water run-off and wastewaters captured within the secondary containment drain to a small sump located in the center, inside, and against the front wall. This sump drains by buried line to a central sump drain located at the edge of the truck unloading area outside of the fuel farm. The central sump drain discharges by gravity through underground pipe to NPDES Sump #1. The buried drain line from the sump inside of the fuel tank farm containment is valved, and was found in the open position during this inspection. A lube oil tank is located outside of and adjacent to the fuel farm, without secondary containment but housed within a steel framework super-structure. See Photos #2 and #4 in Section 1.6 on pages 6 and 7.

Waste Oil Tanks – Two waste oil tanks, with capacities of 7,300 and 5,000 gallons, are installed behind concrete block secondary containment walls adjacent to NPDES Sump #1. Oil spills, skimmed oil, oily wastewaters, and slop are conveyed manually to these waste oil tanks for off-site hauling to the Tafuna Power Plant for reprocessing. The waste oil storage containment is outfitted with a valved drain line to NPDES Sump #1. The drain line valve was found in the open position during this inspection. See Photos #3 and #4 in Section 1.6 on page 7.

Transformer Platform – Transformers are installed over a vault box, adjacent to NPDES Sump #2. The platform is curbed to provide secondary containment around the trans-formers. However the containment is outfitted with an unvalved (and thus always open) drainage line into NPDES Sump #2. See Photo #6 in Section 1.6 on page 7.

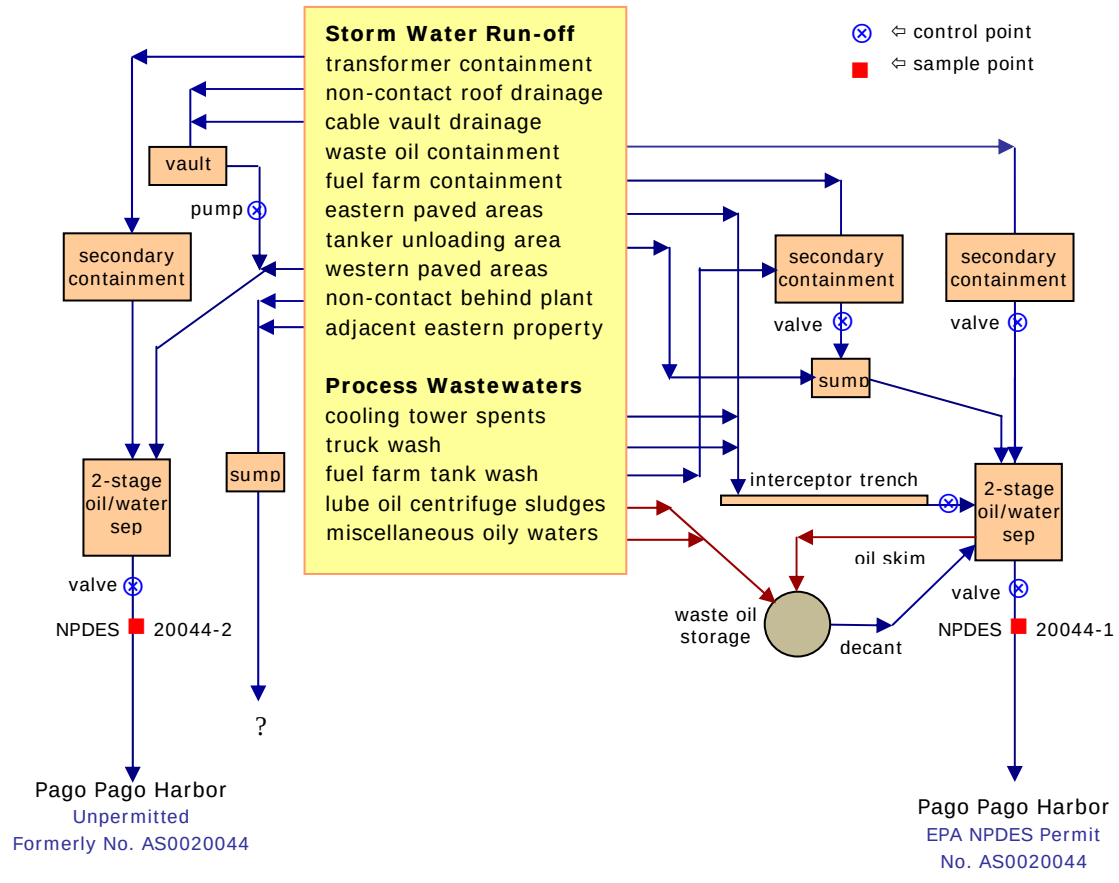
Other Areas – Drainage from behind the fuel farm and the adjacent Starkist facility to the west collects into a sump drain with an unidentified outlet.

1.4 Facility Wastewater Sources, Handling, Treatment and Discharge

1.4.1 General Configuration

The Satala Power Plant generates contact storm water run-off from processing areas, non-contact storm water run-off, fuel tank power washdown, truck wash waters, cooling tower spents, and decanted wastewater from waste oil storage. In addition, oily seepages, thought to be the result of historic spills and losses, fill underground vaults in and around the Satala Power Plant property and at times discharge to the harbor.

Figure 1.4
ASPA Satala Power Plant – Configuration



1.4.2 Wastewater Sources and Handling

Cooling Tower Spents – Approximately three-hundred gallons of spents are drained from each of 12 cooling towers every four months to the underlying cement pad. ASPA indicates that because they do not use them, the cooling tower spents do not contain corrosion inhibitors (*molybdates, phosphates, zinc*) or biocides (*bromides, bleach, quaternary ammonium salts*). If this is so, the cooling tower spents would be expected to contain only trace levels of

zinc and iron from the corrosion of galvanized metal. The cooling water spents drain uncontrolled into the interceptor trench to the oil water separator irrespective of storm events.

Truck Wash – Cloudy wastewater that was said by ASPA to be from truck washing was observed in the interceptor trench. The pollutants in the truck wash are unknown at this time although it is likely to include alkaline soap and the resulting emulsified oils. Truck wash drains uncontrolled into the interceptor trench to the oil water separator irrespective of storm events.

Fuel Farm Tank Wash – ASPA indicates that the diesel tanks are power washed every three weeks with the tail waters drained through the valved drain to the main sump to the oil water separator irrespective of storm events. This tank wash water would be expected to entrain diesel, grime, and organic material.

Waste Oil Storage Decant – The water fractions from oily wastewaters, spills, and slop, collected into the two waste oil storage tanks, periodically are pumped to the oil water separator irrespective of storm events. The waste oil tank decant would be expected to contain low concentrations of free and emulsified oils, diesel, and grime.

Contact Storm Water Drainage – Wastewater drainage from storm water contact with the fuel tanks, the waste oil storage tanks, the cooling towers, the truck fueling station, and the power plant grounds east of the transformer vault, all drain uncontrolled into the interceptor trench to the eastern oil water separator. These drainages would be expected to entrain free and emulsified oils, diesel, grime, and organic material.

Non-Contact Storm Water Drainage - Drainage from storm water contact with the transformers, the power plant grounds west of the transformer vault, and from the building roof, are considered to be non-contact drainage, and thus drain uncontrolled into the western oil water separator. These drainages would be expected to entrain grime, and organic material.

Groundwater Seepage – Oily seepage appears in underground vaults and pipe galleries.

1.4.3 Wastewater Treatment and Discharge

NPDES Sump #1 – Storm water and process wastewater drainage are by design directed through the eastern oil water separator for discharge to the harbor. The eastern oil water separator provides solids settling and oil skimming in two chambers as well as trace free oil removal through a small contact oil film skimmer. In addition, the NPDES permit requires ASPA to involve in the separator operations scheduled visual inspections for floating oils and bottom deposits, and the on-demand removal by pump of captured oil deposits to the waste oil holding tanks.

NPDES Sump #2 – Storm water drainage from non-contact areas of the property and the transformer platform are discharged to the harbor through the western oil water separator. It is equivalent in design to the eastern oil water separator except it does not have a small contact oil film skimmer to remove trace sheen.

1.5 Photo Documentation

Six of the 9 digital photographs taken during this inspection are depicted here in this section. The photographs are saved as *samoa-satala-01.jpg through -09.jpg*.

Photo #1: Cooling Towers and Paved Access Areas
Taken By: Greg V. Arthur
Date: 04/01/08

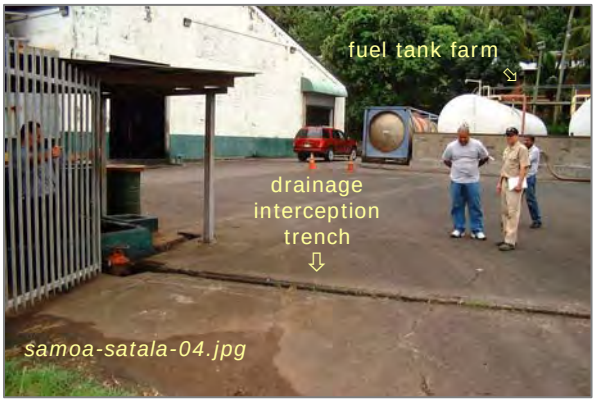


Photo #2: Fuel Tank Farm – Paved Access Areas
Taken By: Greg V. Arthur
Date: 04/01/08

Photo #3: NPDES Sump #1 – Waste Oil Tanks
Taken By: Greg V. Arthur
Date: 04/01/08

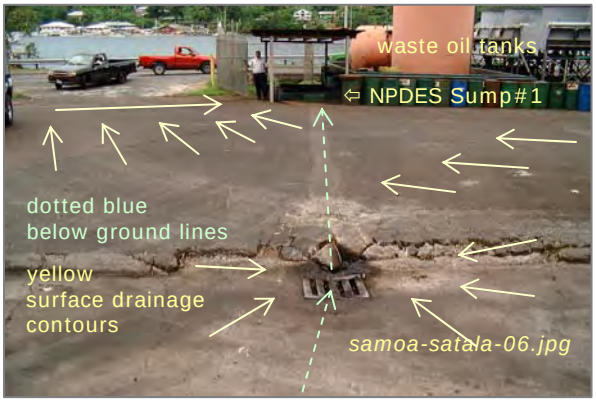


Photo #4: Fuel Farm Sump Drain Lay-out
Taken By: Greg V. Arthur
Date: 04/01/08

Photo #5: NPDES Sump #1 – Soapy Drainage
Taken By: Greg V. Arthur
Date: 04/01/08

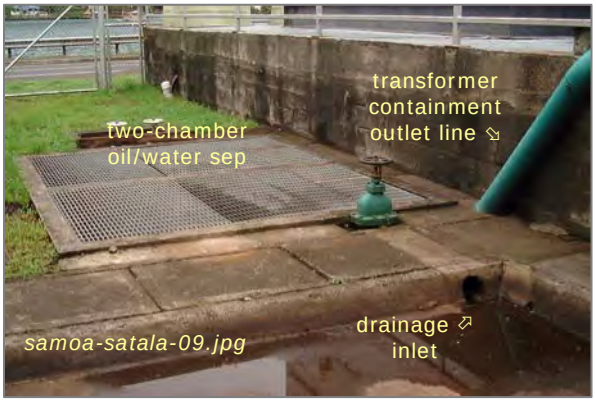


Photo #6: NPDES Sump #2 – Transformer Inlet
Taken By: Greg V. Arthur
Date: 04/01/08

2.0 NPDES Permit Requirements

The NPDES permit must apply Federal BAT/NSPS standards to all regulated sources and the American Samoa water quality standards to the discharge to the ocean.

Summary

The NPDES permit authorizes the discharge to the harbor of process wastewaters and storm water drainage through the eastern oil water separator. The permit establishes discharge limits that apply American Samoa water quality standards for oil and grease, copper, nickel, lead, zinc, pH, and a few narrative receiving water limits. Storm water discharges through the western oil water separator sump are identified as non-contact, and thus the NPDES permit does not cover the western discharge to the harbor. The NPDES permit also requires ASPA to implement a storm water pollution prevention plan ("SWPPP"), which upon approval then becomes an enforceable condition of the permit. See Sections 2.3, 2.4 and 2.5 for NPDES permit discharge limits, and narrative requirements.

Requirements

- None.

Recommendations

- The NPDES permit should require impoundment of the process wastewaters (*cooling water spents, fuel farm wash down, truck wash down*) for discharge during storm events.

2.1 Permit Applicability

NPDES Permit AS0020044 was issued to become effective on May 8, 2004 and to expire on May 7, 2009. A previous version was issued effective on April 15, 1997 and to expire on April 14, 2002. The previous version was administratively extended since ASPA submitted its application for permit renewal on time. The NPDES permit applies American Samoa water quality standards to process wastewaters and storm water drainages. The permit authorizes discharge through the eastern oil water separator sump, designated in this report as the sample point NPDES-20044-1. Discharges through the western oil water separator sump are considered to be entirely of non-contact storm water, and thus authorization for discharge under permit is not needed. The previous version authorized discharge through the western oil water separator sump, designated in this report as the sample point NPDES-20044-2.

2.2 Federal BAT/NSPS Categorical Standards

No Federal categorical standards apply to the Satala Power Plant. The Federal standards in 40 CFR 423 do not apply to diesel engines but rather to steam electric power generating units with 'a thermal cycle employing the steam water system as the thermodynamic medium'.

2.3 Effluent Discharge Limits

The NPDES permit applies American Samoa water quality standards limits to the wastewater discharge from the Satala Power Plant through the eastern oil water separator sump to the harbor, designated in this report as the sample point NPDES-20044-1.

Figure 2.3
NPDES Permit - Discharge Standards and Limits for the Satala Power Plant

NPDES Permit ① AS0020044 - §I.A(1)	Before May 8, 2004		After May 8, 2004		Monitoring	sample
	d-max	mo-avg	d-max	mo-avg	Frequency	type ③
flow (mgd)	②	-	②	-	continuous	estimate
TSS (mg/l)	②	-	②	-	monthly	grab
oil and grease (mg/l)	20.0	-	20.0	-	monthly	grab
copper (µg/l)	②	-	5.8	-	quarterly	grab
lead (µg/l)	②	-	220	-	quarterly	grab
nickel (µg/l)	②	-	75	-	quarterly	grab
zinc (µg/l)	②	-	95	-	quarterly	grab
pH - min/max (s.u.)	6.0 - 8.6	-	6.0 - 8.6	-	monthly	grab

① The limits apply to NPDES-20044-1 throughout and to NPDES-20044-2 before May 8, 2004.
② Monitoring only – No limits.
③ Sampling of discharges from a storm events over 0.1 inches and over 24 hours apart.

2.4 Receiving Water Limits

The NPDES permit applies American Samoa water quality standards as narrative receiving water limits for the discharge to the harbor, but does not require the self-monitoring of the receiving waters.

Figure 2.4
NPDES Permit - General Receiving Water Prohibitions

§I.A	Discharges of process wastewaters and contact storm water drainages are only authorized from the eastern oil water separator sump to the harbor.
§I.B.1a	Discharges shall be substantially free from materials attributable to sewage, industrial wastes ... that will produce objectionable color, odor, or taste in the harbor or biota.
§I.B.1b	Discharges shall be substantially free from visible floating materials, grease, oil, scum, foam, and other floating material attributable to sewage, industrial wastes ...
§I.B.1c	Discharges shall be substantially free from materials attributable to sewage, industrial wastes ... that will produce visible turbidity or settle to form objectionable deposits.
§I.B.1d	Discharges shall be substantially free from substances and conditions ... which may be toxic to humans, animals, plants, and aquatic life, or produce undesirable aquatic life.
§I.B.2	No dumping or discharge of solid, hazardous, or radioactive wastes.

2.5 Storm Water Pollution Prevention Plan

The NPDES permit requires the development and implementation of a storm water pollution prevention plan that then is incorporated as an enforceable element of the permit. The July 1999 plan for the Satala Power Plant established a number of site-specific best management practices ("BMPs") pertinent to the water quality of discharges from the facility.

Figure 2.5
NPDES Permit - Storm Water Pollution Prevention Plan BMPs

§11.A	Scrap metal and non-hazardous waste stored in marked and covered bins for off-site disposal; a waste delivery truck kept operational at all times.
§11.B(a)	The oil water separator visually checked twice per day and hourly during rains; skimmers activated when oil is present; drain valves normally closed and locked.
§11.B(a,b)	Oil water separator oils to be tested prior to off-site reuse; used oil to be delivered to off-site reuse; engine lube oil to be centrifuged for on-site reuse;
§11.B(c)	Spent lube oil centrifuge sludge pumped to the waste oil holding tank; waste oil holding tank decant to return to oil water separator.
§11.B(d)	Lube oil drums stored upright, on elevated pallets, unstacked, and within covered secondary containment; daily visual drum inspections to ensure secured lids.
§11.C(a,b)	Fuel tank farm visually checked upon delivery of diesel to ensure no cracks in the berms, visible oil, visible pipe or valve corrosion; drain valve closed during fueling.
§11.C(c)	Drain valve to the oil water separator normally open.
§11.D	Diesel fuel storage tanks contained within concrete, impermeable secondary containment with a capacity to hold 110% of the largest container.
§12.B(a)	Contents of oil water separator pumped to waste oil holding tanks when oil thickness in the separator exceeds ½-inch.
§12.B(b)	Weekly inspection of the oil water separator for bottom sand, dirt, or sludge, and for leaks or cracks in the waste oil tanks; shovel out when sediment exceeds 2-inches;
§12.B(c)	Monthly clearing of trash and trimming of vegetation from discharge drains.

2.6 Permit Self-Monitoring Requirements

The permit specifically requires the sampling of storm water drainages resulting from storm events of greater than 0.1 inches. This sampling requirement does not explicitly account for the process wastewaters (*cooling tower spents, fuel tank farm wash, truck wash down*) since they are generated irrespective of storm events.

3.0 Compliance with NPDES Permit Requirements

Process wastewaters and storm water drainages are authorized under permit to discharge through the eastern oil water separator to the harbor. [NPDES Permit §I.A]

Process wastewaters and contact storm water drainages are not authorized under permit to discharge through the western oil water separator to the harbor. [NPDES Permit §I.A]

Discharges must comply with the NPDES permit limits set forth as the application of water quality standards and must not cause adverse impacts in the harbor. [NPDES Permit §I.A,B]

Site-specific best management practices developed as part of a storm water pollution prevention plan must be implemented. [NPDES Permit §11,12]

Summary

ASPA Satala Power Plant consistently complies with its NPDES permit effluent limits for conventional pollutants (*total suspended solids, pH, oil and grease*) but not for all metals (*copper, lead, nickel, zinc*). Sampling is limited to capturing the run-off from storm water events of sufficient size and thus does not account for the process-related wastewaters generated during operations. Compliance with the limits for conventional pollutants is reached through settling and skimming of low-strength drainage. The permit limits for metals are set equivalent to the water quality standards for the harbor, and as such without adjustment are not achievable end-of-pipe through the existing or other available technologies for storm water run-off. Additional best management practices and pollution prevention practices should be proposed to address the sources of copper and zinc into the discharge.

Requirements

- None.

Recommendations

- The valved drain line from the fuel tank farm containment sump to the drain lines leading to the eastern oil water separator should be operated in the normally closed position.
- The valved drain line from the waste oil storage containment to the eastern oil water separator should be operated in the normally closed position.
- The unvalved drain line from the curbed transformer platform to the western oil water separator should be retrofitted with a valve then operated in the normally closed position.
- Copper and zinc sources into the drainages should be identified and for each source, and additional best management practices and/or pollution prevention should be proposed.
- Contaminated groundwater seepages should be pretreated through a dedicated package oil water separator for discharge through the eastern oil water separator.

3.1 NPDES Permit Effluent Limits

See Appendix 1 for sampling results of the discharges through NPDES Sump #1 and NPDES Sump #2 to the harbor for conventional pollutants and metals.

Conventional Pollutants - ASPA Satala Power Plant consistently complies with its NPDES permit limits for the discharge of conventional pollutants into the harbor through the eastern oil water separator (NPDES Sump #1). Solids settling and oil skimming, involving a two-chambered clarifier sump and a contact film skimmer, resulted in average and 99th% peak concentrations of 5.0 and 19.5 mg/l oil and grease, 6.7 and 15.3 mg/l total suspended solids, and pH's ranging between 6.2 and 6.9 s.u. While there has been one recorded violation of the NPDES permit limit for oil and grease limit, the entire sample record indicates a statistical probability of violation to be roughly only 1%, which is a level of performance considered equivalent to "consistent" compliance. Also, the sampling of the unregulated discharges through the western oil water separator (NPDES Sump #2) also indicates the presence of little or no conventional pollutant contamination of the storm water drainage with average and 99th% peak concentrations of 3.0 and 9.5 mg/l oil and grease, 6.0 and 13.0 mg/l total suspended solids, and pH's ranging between 6.2 and 6.9 s.u.

Toxic Pollutants - ASPA Satala Power Plant does not consistently comply with its NPDES permit limits for the discharge of metals into the harbor through NPDES Sump #1. In particular, the permitted discharges through NPDES Sump #1 resulted in average and 99th% peak concentrations of 14 and 39 µg/l copper, 74 and 140 µg/l zinc, 1 and 2 µg/l nickel, and 1 and 2 µg/l lead. While the sampling results for nickel and lead are consistent with non-contact storm water drainage, the results for copper and zinc are indications of contact with pollutant sources, with calculated statistical probabilities of violation to be roughly 70% for copper and 20% for zinc. The sampling results for the unregulated discharges through NPDES Sump #2 magnify the trend with average and 99th% peak concentrations of 17 and 55 µg/l copper, 255 and 807 µg/l zinc, 1 and 3 µg/l nickel, and 1 and 2 µg/l lead. Galvanized roofing and siding has been identified as a cause of the significantly higher concentrations of zinc.

3.2 NPDES Permit Receiving Water Limits

The NPDES permit establishes a number of narrative prohibitions as the receiving water limits for Pago Pago Harbor. The facility drainages and drainage sources observed to discharge through NPDES Sump #1 and NPDES Sump #2 would be expected to be substantially free of color, odor, taste, visible floating materials, oils, turbidity, toxicity, or solid wastes, although the soapy wash waters found in the interceptor channel could impart some turbidity in the harbor. In order to reduce the risks of facility drainages adversely impacting the harbor, the drainage lines from the secondary containments for the fuel tank farm, the waste oil tanks, and the transformer platform, all should be operated normally closed to allow visual inspection prior to release to the sumps.

In addition, uncontrolled contaminated ground water seepages into vaults and pipe galleries are not permitted by the NPDES permit for discharge. These wastewaters should be pumped and pretreated through a dedicated package oil water separator prior to discharge to NPDES

Sump #1 for further treatment and authorized discharge to the harbor under the NPDES permit. See the U.S. Army Corp of Engineers design publication, "Designing Coalescing Oil/Water Separators for Us at Army Washracks, ERDC/CERL TR-00-40, December 2000. (http://aec.army.mil/usaec/technology/ows-designing.pdf)

3.3 Water Pollution Prevention Plan Requirements

A number of narrative storm water pollution prevention plan requirements were not evaluated during inspection because their implementation depends on storm events. These include the requirements to perform visual checks for proper operations and structural and functional integrity during storm events. However, it was observed during this inspection that drain valves are not operated as normally closed, and that process wastewaters discharge irrespective of storm events. Finally, the storm water pollution prevention plan should be revised to address the elevated levels of copper and zinc found in the drainages from both NPDES Sump #1 and NPDES Sump #2.

Appendix 1
ASPA Satala Power Plant
Sampling Results for Conventionals and Metals (July 2005 – March 2008)

pollutants	NPDES 001			NPDES 002 ①			d-max viol rates		Sample
	mean	99th%	max	mean	99th%	max	001	002	Count
flow rate (mgd)	-	-	44034	-	-	49829	-	-	18/18
total susp solids (mg/l)	6.7	15.3	15.0	6.0	13.0	14.0	-	-	22/23
oil and grease (mg/l)	5.0	19.5	32.0	3.0	9.5	11.1	**1** / 26	-	26/23
copper (µg/l)	14.1	38.7	41.0	16.9	55.3	53.0	**7** / 10	-	10/10
lead (µg/l)	0.53	2.2	1.9	0.5	2.5	2.7	0 / 10	-	10/10
zinc (µg/l)	73.8	139.5	128.0	254.5	806.9	818.0	**3** / 10	-	10/10
nickel (µg/l)	0.67	1.8	1.9	0.7	2.1	2.1	0 / 10	-	10/10
pH min-max (s.u.)	-	6.2 min	6.9 max	-	6.2 min	6.9 max	0 / 22	-	22/23

① No permit limits in effect for NPDES 002 after May 8, 2004.

violation probabilities	mean	std dev	statistical probability		Percent
d-max - oil and grease (mg/l)	µ = 4.975	σ = 6.2463	α(*20*)	= 0.0081	~1%
d-max - copper (µg/l)	µ = 14.06	σ = 10.584	α(*5.8*)	= 0.7177	~70%
d-max - zinc (µg/l)	µ = 73.77	σ = 28.196	α(*95*)	= 0.2257	~20%

days of violation	sample days	sampler	type	NPDES permit limits		violation
1	03/04/08	ASPA	grab	copper d-max	5.8 µg/l	8.3
1	09/24/07	ASPA	grab	copper d-max	5.8 µg/l	11.0
1	03/06/07	ASPA	grab	copper d-max	5.8 µg/l	14.1
1	12/26/06	ASPA	grab	zinc d-max	95 µg/l	108
1	08/20/06	ASPA	grab	copper d-max	5.8 µg/l	41.0
1	06/14/06	ASPA	grab	copper d-max	5.8 µg/l	15.3
1	06/14/06	ASPA	grab	zinc d-max	95 µg/l	128
1	04/08/06	ASPA	grab	oil and grease d-max	20 mg/l	32.0
1	02/02/06	ASPA	grab	zinc d-max	5.8 µg/l	35.6
1	01/02/06	ASPA	grab	copper d-max	5.8 µg/l	16.3
1	09/19/05	ASPA	grab	copper d-max	5.8 µg/l	17.9