

US EPA ARCHIVE DOCUMENT



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

April 4, 2011

In Reply Refer To: WTR-7

Brett Butler, General Manager  
Starkist Samoa, Inc.  
P.O. Box 368  
Pago Pago, Tutuila, American Samoa 96799

**Re: September 30, 2010 Clean Water Act Inspection**

Dear Mr. Butler:

Enclosed is the April 4, 2011 report for our September 30, 2010 inspection of the Starkist Company. Please submit a short response to the findings in Sections 1 through 3 of this report to EPA and ASEPA, by **June 30, 2011**. The main findings are summarized below:

- 1** Starkist complies with the NPDES permit limits for conventional pollutants, nutrients, and toxics that apply to the wastewater discharges into the Joint Cannery Outfall. Compliance is reached through (1) well-designed and sized chemically-aided primary solids removal, and (2) diversion of high-strength wastes to marine disposal.
- 2** The Joint Cannery Outfall continues to be a significant asset that benefits overall water quality in the harbor. Receiving water monitoring has not registered definitive evidence of impact in Pago Pago Harbor from the Starkist discharges through the Joint Cannery Outfall.
- 3** Starkist should determine the validity of the April-June 2008 and July-September 2008 wastewater summary reports since the sample results for these quarters were identical.
- 4** Starkist reclaims two significant waste streams, heavy fish solids into fish meal and waste oils from off-site and in-plant sources into boiler feed fuel.
- 5** This inspection did not cover the marine disposal by ship.

I appreciate the helpfulness of your staff during this inspection. We remain available to assist in any way. Please feel free to call me at (415) 972-3504, or e-mail [arthur.greg@epa.gov](mailto:arthur.greg@epa.gov).

Sincerely,

*Original signed by:*

Greg V. Arthur  
CWA Compliance Office

cc: Lt. Lyle Setwin, ASEPA



**U.S. ENVIRONMENTAL PROTECTION AGENCY**

**REGION 9**

**CLEAN WATER ACT COMPLIANCE OFFICE**

**NPDES COMPLIANCE EVALUATION INSPECTION**

NPDES Permittee: Starkist Samoa, Inc.  
Atu'u, Maoputasi

Facility: P.O. Box 368, Pago Pago, Tutuila Island, American Samoa  
Discharged through the Joint Cannery Outfall  
(NPDES Permit No. AS0000019)

Receiving Water: Pago Pago Harbor

Date of Inspection: September 30, 2010

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Inspection Participants:

US EPA: Greg V. Arthur, CWA Compliance Office, (415) 972-3504

ASEPA: None

Starkist Samoa: Joe Carney, Utilities/Environment, Department Head, (684) 644-2860  
Leaia Sam Mose, EPA Specialist

Report Prepared By: Greg V. Arthur, Environmental Engineer, USEPA Region 9

April 4, 2011

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## 1.0 Scope and Purpose

On September 30, 2010, EPA conducted an NPDES compliance evaluation inspection of Starkist Company, American Samoa (“Starkist”). 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.

Starkist 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 September 30, 2010.

## 1.1 Background

Starkist Company, owned by Dong Won of South Korea, is a tuna cannery sited on the north-western side of Pago Pago Harbor in the village of Atu'u. Starkist is one of two canneries in American Samoa located adjacent to each other on the harbor, along with a can making plant, and a repair facility for tuna fishing and processing ships. The other cannery, COS Samoa, suspended operations in 2009. Starkist produces cooked tuna products, fish meal, and fish oil. Independent contractors deliver unprocessed tuna frozen in the holds of their ships. The tuna cannery work involves dock receiving, thawing, cooking, processing, packing, refrigeration, and rendering. Starkist does not manufacture cans, shipping pallets, mylar packaging, or packaging labels. American Samoa Power Authority (“ASPA”) provides electrical, water, and sewer utilities. Starkist has boilers, stand-by electrical generation capacity, water softening, cold storage, and a tank farm.

On February 28, 2008, US EPA issued a revised NPDES permit No.AS0000019 to Starkist for its discharge to the harbor. Since 1992, industrial wastewaters from both the Starkist and COS Samoa canneries have discharged together through the deep water Joint Cannery Outfall to the outer harbor, although each cannery holds an individual permit. The current permit for Starkist took effect on April 1, 2008 and is set to expire on March 31, 2013. The previous permit was issued on December 21, 2000. See Section 2.0 on page 8 for further description of the permit requirements.

## 1.2 Facility SIC Code

Starkist is assigned the SIC code for canned and cured fish and seafoods (SIC 2091).



### 1.3 Facility Description

Starkist consists of interconnected buildings located along a long dock on the north shore of the Pago Pago inner harbor. Cannery operations were found during this inspection to be relatively unchanged since the previous NPDES inspection in April 2009. See Section 1.6 on page 7 of this report for photo documentation.

Loading Dock - Containers of frozen whole tuna are unloaded from fishing ships into metal holding bins stacked on the dock. The dock runs the length of the facility with curbing along the harbor and around the dock forming containment. The metal holding bins are washed out on the dock with sea water. The dock itself is washed off many times throughout the day with sea water and, as a result, was observed to be clean of debris, oily sheens, visible solids, and any fish-related by-products or waste. All wastewaters associated with the dock operations, including storm water run-off, process drainage, and dock wash down, are captured within the curbing through floor drains into the dockside central pits for delivery into the low-strength wastewater treatment system. See Photos #1 and #2 in Section 1.6 on page 6.

Thawing - The metal holding bins of frozen tuna are stacked within a thawing bay for circulating spray quenching with chlorinated sea water. Excess thaw water drains into the blood pit which overflows to the dockside central pits for pumped delivery into the low-strength water treatment system.

Butchering - Thawed fish are loaded on moving conveyers for cutting and gutting. Viscera are collected for delivery to rendering. Blood, and some entrails and viscera, are squeegeed into a floor drain leading to the dockside central pits for delivery to the low-strength wastewater disposal system.

Precooking - The butchered fish are loaded into tray bins for steam cooking in a series of retort cookers. The bins of pre-cooked fish are water quenched in a chilling bay. The retort condensate and cook juice generated from the retort cookers drain to the high-strength waste disposal system. The retort cooking quench water collects into a reclaim tank to boilers and fish meal reclaim, with the excess bleed drained into the low-strength wastewater treatment system. The reclaim tank sludges are fed as scrap into the rendering plant.

Packing - The precooked and chilled fish are loaded onto moving conveyer tables for manual skinning, boning, and sorting by grade. Tuna meat is then delivered to product lines for packaging, canning, broth/oil filling, lid seaming, retort re-cooking of the filled and sealed cans and mylar pouches, and final labeling and boxing. The sealed and re-cooked cans and mylar pouches are air quenched. The bone and skin scrap is fed into a corkscrew auger for delivery as solids to the rendering plant. The cans and lids arrive pre-made. Boxes, labeling, and mylar packaging arrive pre-printed. Final products are shipped out by shipping container.

Rendering - Starkist produces fish meal and fish oil products from processing scrap. The rendering process involves auger delivery to rendering, re-cooking, auger screw pressing, drying through a rotating dryer, and final bagging. The auger screw press drainage is pumped to the low-strength wastewater treatment system. Decanted fish oil from the auger



screw press and the cookers is processing through multi-staged decanting and final centrifuges, with high-quality oil sold as product and low-quality oil reclaimed as boiler feed.

Refrigeration and Utilities - Starkist employs ammonia chillers. Plant utilities also include boilers, standby electric power generators, water softening, dockside chlorination, a tank farm and air compressors. Condensate, boiler blowdown, chiller blowdown, tank farm drainage, and softener brines all drain or are pumped into the low-strength wastewater treatment system. Plant, equipment, flooring, and conveyances are washed down plant-wide with hot water, caustic foaming cleaner, and chlorinated sanitizer, into the low-strength wastewater treatment system during the graveyard shift from 3:00am to 6:00am. Starkist also reclaims waste oils, collected by ASPA island-wide, through a centrifuge for boiler feed on-site. COS Samoa previously reclaimed waste oils prior to their 2009 shutdown.

#### 1.4 Facility Wastewater Sources, Handling and Discharge

Starkist uses both sea water and ASPA-provided fresh water. The resulting plant and equipment wash down, thaw and quench waters, condensate, and various equipment blowdowns, along with fish processing wastes, storm water run-off, and off-site waste oil are handled for disposal and discharged in five principle ways. See Figure 1.4 on the next page for a schematic of the wastewater generation, handling, and discharge at Starkist.

Low-Strength Wastewaters – Plant and equipment washdowns, contact storm water run-off, and non-contact utility waters generated throughout the facility discharge to a facility-wide floor drainage systems leading to low-strength wastewater treatment with a design capacity of 2.9 mgd. These low-strength wastewaters carry fish slime, blood, some entrails and other solids, oils, and chemical cleaners. The low-strength wastewaters collect in a series of sumps that feed drainage through rotary screen filters to remove bulk solids. The screened wastewaters drain to equalization tanks for pumping through a dissolved air flotation (“DAF”) clarifier to further remove light solids. A mid-level tap draws decanted wastewater for pressurization. Both anionic polymers and alum are added to the pressure vessel. The pressurized contents produce dissolved air upon release in the DAF unit. The DAF decant discharges through a flume to a 14-inch pipeline for discharge through the 1.5-mile Joint Cannery Outfall. Caustic for pH control is injected into the DAF decant discharge. Starkist discharges an average of 1.2 million gallons per day to the outfall. The discharge flume serves as the NPDES permit sample point, designated in this report as NPDES-00019. Only low-strength wastewaters from Starkist now feed through the outfall for discharge to the outer Pago Pago Harbor. See Photos #3, #4, #5 and #6 in Section 1.6 on page 7.

High-Strength Wastes - The high-strength solids, wastewaters from butchering and pre-cooking, and DAF skim solids collect into to an equalization tank with over a day of storage. The equalization tank contents are pumped to the Blue Moon for off-site hauling by ship to an EPA-approved ocean dump site located off-shore. Starkist generates an average of 76,000 gallons of high-strength waste per day.

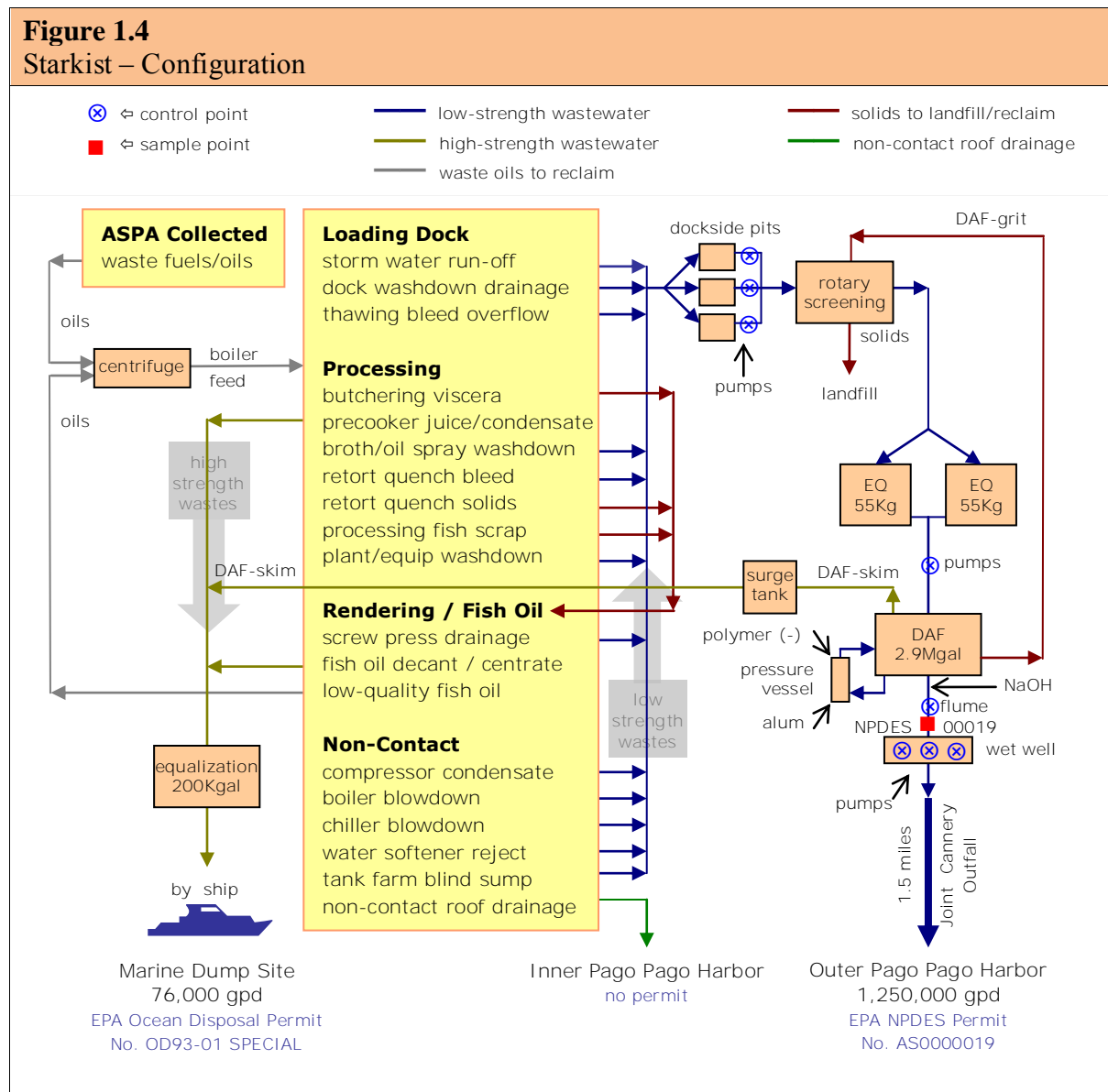
Non-Contact Wastewaters - The non-contact wastewaters associated with the plant utilities drain to the low-strength wastewater system. These wastewaters include non-contact air



compressor condensate, boiler blowdown, water softener brines, chiller blowdown, and captured tank farm drainage. Non-contact roof drainages discharge by downspouts directly to storm water conveyances into the ocean.

**Solids** - Processing scrap from packing is delivered by auger through floor trenching to an on-site rendering plant to produce fish meal and fish oil. Auger screw pressings of the fish processing scrap and rotary screenings remove both wastewaters for discharge by floor drain to the high-strength wastewater line and decanted oils for further processing.

**Oils** - Fish oils from the rendering plant are segregated into product- and fuel-grades with the two streams separately processed through hydrocycloning and centrifuging. The product-grade fish oil is packaged as product. The fuel-grade fish oils, along with waste fuels and oils collected island-wide by ASPA, are reclaimed on-site as facility boiler feed.



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## 1.5 Facility Wastewater Composition

Low-Strength Wastewater - These wastewaters, discharged through the Joint Cannery Outfall contain fish blood, slime, solids, and oils, as well as the chemical cleaners used in plant and equipment washdown. Fish-related products would be expected to contain organics, non-petroleum fats and oils, suspended solids, ammonia-nitrogen, and trace elements in the fish tissue such as iron, phosphorus, and mercury. The chemical cleaners contain alkaline non-phosphated cleaners and emulsifying degreasers (*hydroxides, metasilicate*), and a chlorinated non-foaming cleaner (*sodium dichloroisocyanurate*).

High-Strength Wastes - These wastes (>50,000 mg/l-BOD), shipped out to an ocean dump site, would be expected to entrain the same contaminants as the low-strength wastewaters but at higher concentrations.

Roof Drainage - These flows, discharged directly to the harbor by downspout, would not be expected to entrain pollutants beyond possibly zinc from galvanized metal roofing and slightly oily atmospheric grime.





## 1.6 Photo Documentation

Five of the eight digital photographs taken during this inspection are depicted here in this section. The photographs are saved as *samoa-071-093010.jpg* through *-078-093010.jpg*.



Photo #1: Harbor Dock - Dock Washed and Clean  
Taken By: Greg V. Arthur  
Date: 09/30/10



Photo #2: Dockside Central Pits - Pumps To WWTP  
Taken By: Greg V. Arthur  
Date: 09/30/10



Photo #3: Dissolved Air Flotation Unit - Surface Weirs  
Taken By: Greg V. Arthur  
Date: 09/30/10



Photo #4: DAF Skim - Holding to High-Strength Tank  
Taken By: Greg V. Arthur  
Date: 09/30/10



Photo #5: ITPW Effluent Flume - NPDES 00019  
Taken By: Greg V. Arthur  
Date: 09/30/10



## 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 of low-strength wastewater through the Joint Cannery Outfall. The permit imposes effluent discharge limits that apply both Federal standards for tuna processing and American Samoa water quality standards to the discharge from Starkist into the Joint Cannery Outfall. The Federal standards impose production-based limits for total suspended solids, oil and grease, and pH. The American Samoa water quality standards establish effluent discharge limits for phosphorus, total nitrogen, ammonia, copper, zinc, and mercury, as well as other narrative and numerical receiving water limits for the combined discharge from outfall. Finally, the NPDES permit requires Starkist to develop best management practices for spill and drainage control, a pollution minimization plan for the sources of copper, zinc, and mercury, and a chronic toxicity study. See Sections 2.3 through 2.4 for NPDES permit narrative requirements and permit limits.

### *Requirements*

- None.

### *Recommendations*

- The NPDES permit should specifically identify the compliance sampling point for the discharge of effluent from Starkist into the Joint Cannery Outfall.

## 2.1 Permit Applicability

NPDES Permit AS0000019 currently in effect was issued February 28, 2008. The previous version was issued effective on January 23, 2000. The Federal regulations in 40 CFR 122.21(d) allowed the administrative extension of the permit because Starkist submitted its application for permit renewal at least 180 days before it expired. All versions of the NPDES permit apply the Federal categorical standards and American Samoa water quality standards to the effluent discharge from Starkist into the Joint Cannery Outfall, identified as the effluent flume and designated in this report as the sample point NPDES-0000019. The NPDES permit also applies the American Samoa water quality standards to the receiving waters around the Joint Cannery Outfall, which is designated in the permit as Discharge Point 001. The NPDES permit does not authorize any other discharges from Starkist.

The discharge of high-strength waste by ship to a Federally-permitted ocean disposal site is authorized under a separate permit (EPA Ocean Disposal Permit No. OD93-01 SPECIAL). This inspection did not include a compliance evaluation of the ocean dumping permit.



## 2.2 Federal BAT/NSPS Categorical Standards

The Federal categorical standards for tuna processing in 40 CFR 408 Subpart N apply to the effluent discharge from Starkist to the Joint Cannery Outfall. The Federal standards impose loading limits for total suspended solids and oil and grease, based on a maximum average daily production of 600 tons of tuna processed per day. The Federal standards also impose pH limits. Starkist does not generate any wastewaters regulated under any other Federal categorical standard in 40 CFR 407-471.

## 2.3 Effluent Discharge Limits

The NPDES permit applies Federal categorical standards and American Samoa water quality standards limits to the effluent discharge from Starkist into the Joint Cannery Outfall, designated in this report as the sample point NPDES-00019.

**Figure 2.3**  
NPDES Permit - Discharge Standards and Limits for Starkist

NPDES Permit ① AS0000019 §I.A Table 1	Before April 1, 2008		After April 1, 2008		monitoring frequency	sample type
	d-max	mo-avg	d-max	mo-avg		
flow (mgd)	2.90	-	②	-	continuous	flume
BOD (mg/l)	②	②	②	②	weekly	24-hr
TSS (lbs/d)	7536	2996	9960	3960	weekly	24-hr
oil and grease (lbs/d)	1907	763	2520	1008	weekly	grab ④
total nitrogen (lbs/d)	2100	1200	2100	1200	2/week	24-hr
total phosphorus (lbs/d)	309	192	309	192	2/week	24-hr
ammonia-N (lbs/d)	-	-	4045	2016	weekly	24-hr
mercury (lbs/d)	-	-	0.11	0.04	2/year	24-hr
copper (lbs/d)	-	-	2.84	1.41	2/year	24-hr
zinc (lbs/d)	-	-	55.2	27.5	2/year	24-hr
ammonia-N (mg/l)	133	-	167	83	weekly	24-hr
mercury (µg/l)	-	-	4.72	1.80	2/year	24-hr
copper (µg/l)	108	66	117	58	2/year	24-hr
zinc (µg/l)	1770	1545	2284	1138	2/year	24-hr
temperature (°F)	95°F	90°F	95°F	90°F	continuous	probe
pH - min/max (s.u.) ③	6.5 - 8.6	-	6.5 - 8.6	-	continuous	probe
acute toxicity (t.u.)	②	②	-	-	-	-

① These limits apply at the flume discharge into the Joint Cannery Outfall (NPDES-00019).

② Monitoring only - No limits.

③ Time outside limits cannot exceed 7 hrs 26 min / month - No excursion can exceed 60 min.

④ Manual composites of four grab samples per day

The NPDES permit applies Federal production-based standards established as mass-loading limits for total suspended solids, and oil and grease, as well as a limit for pH. The NPDES permit also applies American Samoa water quality standards established as limits based on



the dilution available through the use of the Joint Cannery Outfall for phosphorus, nitrogen, ammonia, copper, zinc, mercury, and temperature. An acute toxicity limit was not included in the current NPDES permit because two pollutants with specific limits, ammonia and zinc have been identified as the likely causes of any toxicity found in the discharge.

## 2.4 Site-Specific Receiving Water Limits

The NPDES permit applies American Samoa water quality standards as receiving water limits that apply to both Starkist and COS Samoa for the combined discharge from the Joint Cannery Outfall into Pago Pago Harbor.

**Figure 2.4.1**  
NPDES Permit - General Receiving Water Prohibitions

§I.A	Discharges are only authorized from the Joint Cannery Outfall outlet.
§I.B.1	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.2	Discharges shall be substantially free from visible floating materials, grease, oil, scum, foam, and other floating material attributable to sewage, industrial wastes ...
§I.B.3	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.4,6	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.5	Discharges shall not cause a >1.5°F change, >1°F hourly fluctuation, or exceed 85°F.

**Figure 2.4.2**  
NPDES Permit - Zone of Initial Dilution Prohibitions

§I.B.7	Discharges shall not cause turbidity to exceed 0.75 Nephelometric Units.
§I.B.8	Discharges shall not cause a light penetration depth <65 feet for >50% of the time.
§I.B.9	Discharges shall not cause dissolved oxygen of <70% saturation, or <5.0 mg/l.

**Figure 2.4.3**  
NPDES Permit - Zone of Mixing Prohibitions

§I.C.1	Discharges shall not cause a water column concentration >0.05 µg/l mercury.
§I.D.1	Discharges shall not cause concentrations >30.0 µg/l total phosphorus.
§I.D.2	Discharges shall not cause concentrations >200.0 µg/l total nitrogen.
§I.D.3	Discharges shall not cause concentrations >1.0 µg/l chlorophyll-a.

The NPDES permit requires Starkist to conduct semi-annual self-monitoring of the receiving waters at the following five sampling stations: the Station 5 reference site, Station 14 at the end-of-pipe, Stations 8 and 8a at the zone of initial dilution boundary, and Station 16 at the zone of mixing boundary.



### 3.0 Compliance with NPDES Permit Requirements

- *Industrial waste and storm water discharges are authorized on from the Joint Cannery Outfall into Pago Pago Harbor and from a commercial vessel, the Blue Moon, to an off-shore EPA-permitted ocean disposal site. [NPDES Permit §I.A]*
- *Industrial waste and storm water discharges from the Joint Cannery Outfall must comply with the NPDES permit discharge limitations set forth as the application both of Federal standards and the American Samoa water quality standards. [NPDES Permit §I.A]*
- *Combined discharges from Starkist must not cause adverse impacts in the receiving waters around the Joint Cannery Outfall. [NPDES Permit §I.B, I.C and I.D]*

#### *Summary*

Starkist continues to consistently complies with its NPDES permit effluent limits for conventional pollutants (*total suspended solids, pH, oil and grease*), and for nutrients (*total nitrogen, total phosphorus*). Compliance is reached through primary solids removal with rotary screening, equalization, chemically-aided dissolved air flotation (all well-designed and sized), and the effective diversion of high-strength wastes to marine disposal by ship. Starkist also is expected to consistently comply with its NPDES permit effluent limits for toxics (*ammonia, mercury, copper, zinc*) and is not expected to introduce other toxics in toxic amounts (*petroleum distillates, pesticides, PCBs, solvents*). Finally, receiving water monitoring does not indicate measurable impacts in Pago Pago Harbor from the combined discharges from Starkist through the Joint Cannery Outfall.

#### *Requirements*

- None.

#### *Recommendations*

- The wastewater summary reports for July-September 2009 are duplicates of those for April-June 2009. The DMRs for these six months should be verified.

### 3.1 NPDES Permit Effluent Limits for Starkist

See Table 3.1 on page 14 of this report for sampling results of the discharge to the Joint Cannery Outfall for conventional pollutants, nutrients, and metals.

Conventional Pollutants - Starkist consistently complies with its NPDES permit limits for the discharge of conventional pollutants into the Joint Cannery Outfall. Fish parts and wastes comprise the sources of conventional pollutants in the discharge. Primary solids removal, involving well-designed and properly-sized rotary screening, equalization, and chemically-aided dissolved air flotation, resulted in average and 99th% peak concentrations of 102.4 and 169.7 mg/l total suspended solids (“TSS”), 402.3 and 647.9 mg/l biochemical oxygen



demand (“BOD”), and 18.2 and 39.1 mg/l oil and grease. The resulting removal rates are estimated to average 80% for TSS, 90% for oil and grease, and 75% for BOD. As a result, consistent compliance with the NPDES permit limits is expected to continue, through advanced chemically-aided primary solids removal and the effective diversion of high-strength wastes to marine disposal by ship.

Nutrients - Starkist consistently complies with its NPDES permit limits for the discharge of total nitrogen and total phosphorus into the Joint Cannery Outfall. Fish parts and wastes comprise the source of nutrients in the discharge. Primary solids removal resulted in average and 99th% peak concentrations of 65.8 and 95.0 mg/l total nitrogen, and 9.8 and 13.9 mg/l total phosphorus. The removal rates are estimated to average 60% for nitrogen and 50% for phosphorus. These removal rates for nutrients are less than the rates for conventional pollutants, which indicates that the nutrients exist more in a dissolved state and not in the oil fraction. Nevertheless, advanced primary solids removal and diversion of high-strength wastes to marine disposal, removes enough of the nutrients to result in continued consistent compliance with the NPDES permit limits.

Toxic Pollutants - Starkist consistently complies with its NPDES permit limits for the discharge of toxics into the Joint Cannery Outfall. The permit establishes limits only for mercury, copper, and zinc, all thought to come from fish parts and wastes, and for ammonia, which is also entrained in fish parts and wastes, a fraction of which, depending on the pH of the receiving water, is in the un-ionized toxic form. Primary solids removal resulted in average and 99th% peak concentrations since July 2008 of 28.0 and 47.2 mg/l ammonia resulting in a 35-40% increase in the average mass loading of ammonia. Primary solids removal also resulted in maximum concentrations of 0.13 µg/l mercury, 3.1 µg/l copper, and 233 µg/l zinc.

Other Inorganics - There are no American Samoa water quality for other inorganics and thus no corresponding NPDES permit limits applied to the discharge from Starkist to the Joint Cannery Outfall. Nevertheless, the Starkist discharge entrains sulfur compounds and aluminum resulting from the use of alum for wastewater treatment in the DAF unit.

Temperature and pH - Starkist consistently complies with its NPDES permit limits for the pH and temperature of the discharge into the Joint Cannery Outfall.

### 3.2 NPDES Permit Receiving Water Limits

See Table 3.2 on page 15 of this report for the 2008-2010 sample results of the receiving waters in and around the discharge from the Joint Cannery Outfall for dissolved oxygen, nutrients, ammonia and metals.

Conventional Pollutants - Dissolved oxygen and visual observations of the harbor surface are the measures in the receiving waters reflective of the impacts of conventional pollutants from the combined discharge from the Joint Cannery Outfall to the Pago Pago Harbor. These measures do not indicate a measurable impact in the receiving waters from the outfall discharge of conventional pollutants. In particular, no oily slicks, floating solids, or cloudy



conditions were seen around the outfall, and all samples met the standard for dissolved oxygen at the four sampling stations influenced by the outfall discharge.

Nutrients - Nutrient levels over the water quality standards were found at all stations sampled for nutrients, specifically at both reference stations and one zone-of-mixing station. As a result, the sample results above 200 µg/l-total nitrogen (6 of 18 samples) and the few above 30 µg/l-total phosphorus (2 of 18 samples) are not conclusive evidence of a measurable impact from the Joint Cannery Outfall discharge in violation of the NPDES permit requirements. In particular, nitrogen levels exceeded standards at all of the stations including the reference stations, and Starkist Samoa complies with the permit effluent limits for total nitrogen and phosphorus in its discharge into the Joint Cannery Outfall.

Toxics - The NPDES permit applies water quality standards for toxics only at the zone of mixing boundary and for only mercury. All samples, including those taken from at the zone of mixing station, met the NPDES permit limits. Moreover, Starkist complies with the permit effluent limits for ammonia, copper, zinc, and mercury in its discharge into the Joint Cannery Outfall.



**Table 3.1**  
**Starkist Sampling Results (July 2008 – June 2010)**

conventionals and nutrients	permit limits		Starkist effluent ①③			violation rates		sample count
	d-max	mo-avg	mean	99th%	Max	d-max	mo-avg	
tuna production (tons/d)	-	-	437.3	617.1	-	-	-	368
flow rate (mgd)	-	-	1.196	2.434	2.400	-	-	639
total susp solids (lbs/d)	9960	3960	1338.7	2282.4	2648.5	0 / 84	0 / 21	84
total nitrogen (lbs/d)	2100	1200	882.3	1295.8	1457.0	0 / 167	0 / 21	167
total phosphorus (lbs/d)	309	192	133.6	192.1	199.6	0 / 168	0 / 21	168
oil and grease (lbs/d)	2520	1008	238.4	504.2	650.8	0 / 84	0 / 21	84
total susp solids (mg/l)			102.4	169.7	164.0	-	-	71
total nitrogen (mg/l-N)			65.8	95.0	91.0	-	-	142
total phosphorus (mg/l)			9.8	13.9	13.4	-	-	142
oil and grease (mg/l)			18.2	39.1	56.3	-	-	71
BOD (mg/l)			402.4	647.9	651.7	-	-	82
temperature (°C)	95°F	90°F	82°F	-	95°F	0 / 518	0 / 21	②
pH maximum (s.u.)	8.6-instant		6.8-min	7.2-median	8.1-max	0 / 517	-	②
pH minimum (s.u.)	6.5-instant		6.5-min	7.0-median	7.3-max	0 / 517	-	②

toxic pollutants	permit limits		Starkist effluent ①③			violation rates		sample count
	mean	99th%	mean	99th%	Max	d-max	mo-av	
ammonia (mg/l-N)	167	83	28.0	47.2	46.8	0 / 71	0 / 21	71
mercury (µg/l)	4.72	1.80	0.11	0.22	0.16	0 / 6	0 / 6	6
copper (µg/l)	117	58	2.63	5.86	5.16	0 / 6	0 / 6	6
zinc (µg/l)	2284	1138	171	369	284	0 / 6	0 / 6	6
ammonia (lbs/d)	4045	2016	371.9	627.2	580.5	0 / 71	0 / 21	71
mercury (lbs/d)	0.11	0.04	0.0014	-	0.0018	0 / 2	0 / 2	2
copper (lbs/d)	2.84	1.41	0.033	-	0.048	0 / 2	0 / 2	2
zinc (lbs/d)	55.2	27.5	2.69	-	3.64	0 / 2	0 / 2	2

① Effluent samples collected from IWD-00019 before discharge into the Joint Cannery Outfall.

② Continuous monitoring

③ No sample results for July-September 2008 and first three weeks of October 2009.

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**Table 3.2**  
**Joint Cannery Outfall - Receiving Water Monitoring (2008 - 2010) ①**

parameters	Station 5 - Outer Harbor			Station 8 - ZID			Station 8A - ZID		
	mean	max	over ②	mean	max	over ②	mean	max	over ②
dissolved oxygen (mg/l)	5.73	5.44	0 / 6	6.19	5.49	0 / 6	6.07	5.42	0 / 6
total nitrogen (mg/l)	0.36	1.42	<b>2 / 6</b>	-	-	n/a	-	-	n/a
total phosphorus (mg/l)	0.012	0.020	0 / 6	-	-	n/a	-	-	n/a
ammonia (mg/l-N)	0.010	0.020	n/a	0.016	0.040	n/a	0.028	0.060	n/a
copper (µg/l)	0.77	3.08	n/a	0.29	0.46	n/a	0.28	0.35	n/a
zinc (µg/l)	2.12	3.56	n/a	1.80	2.83	n/a	1.53	2.57	n/a
mercury (µg/l)	0.0059	0.0088	0 / 6	0.0032	0.0064	0 / 6	0.0032	0.0071	0 / 6

parameters	Station 13 - Inner Harbor			Station 14 - Outfall			Station 16 - ZOM		
	mean	max	over ②	mean	max	over ②	mean	max	over ②
dissolved oxygen (mg/l)	-	-	n/a	5.84	5.27	0 / 6	6.42	5.46	0 / 6
total nitrogen (mg/l)	20.1	119.2	<b>2 / 6</b>	-	-	n/a	0.43	1.52	<b>2 / 6</b>
total phosphorus (mg/l)	0.023	0.055	<b>2 / 6</b>	-	-	n/a	0.014	0.026	0 / 6
ammonia (mg/l-N)	-	-	n/a	0.033	0.060	n/a	-	-	n/a
copper (µg/l)	-	-	n/a	0.32	0.67	n/a	-	-	n/a
zinc (µg/l)	-	-	n/a	1.85	2.94	n/a	-	-	n/a
mercury (µg/l)	-	-	n/a	0.0028	0.0039	0 / 6	-	-	n/a

① Semi-annual sampling at three water column depths for each station.

② Indicates the rate of water column samples exceeding the water quality standards.

Reference Stations

Station 5 - Outer Harbor in Ocean Transition Zone  
Station 13 - Inner Harbor in Uppermost Zone

Stations Influenced by the Outfall Discharge

Station 14 - Outfall Discharge  
Station 8 - Zone of Initial Dilution (Lower Boundary)  
Station 8A - Zone of Initial Dilution (Upper Boundary)  
Station 16 - Zone of Mixing Boundary

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