Utah Division of Water Quality
Statement of Basis
ADDENDUM
Wasteload Analysis and Antidegradation Level I Review

Date: **March 24, 2023**

Prepared by: **Christopher L. Shope, PhD**
Standards and Technical Services

Facility: **Autoliv ASP Inc., UPDES Permit No. UT0024911**
ATK Launch Systems, LLC, UPDES No. UT0024805

Receiving water: **Blue Creek, Promontory Point (2B, 3D, 4)**

This addendum summarizes the wasteload analysis that was performed to determine water quality based effluent limits (WQBEL) for this discharge. Wasteload analyses are performed to determine point source effluent limitations necessary to maintain designated beneficial uses by evaluating projected effects of discharge concentrations on in-stream water quality. The wasteload analysis also takes into account downstream designated uses (UAC R317-2-8). Projected concentrations are compared to numeric water quality standards to determine acceptability. The numeric criteria in this wasteload analysis may be modified by narrative criteria and other conditions determined by staff of the Division of Water Quality.

Discharge

Autoliv

Outfall 001: Blue Creek (Stream Discharge) → Bear River Migratory Bird Refuge → Bear River Bay of Great Salt Lake
0.03 MGD maximum daily discharge

ATK

Outfall 001: South Plant → Blue Creek → Bear River Migratory Bird Refuge → Bear River Bay of Great Salt Lake
The maximum daily design discharge is 0.50 MGD and the maximum monthly design discharge is 0.35 MGD for the facility.

Outfall 002: North Plant → Blue Creek → Bear River Migratory Bird Refuge → Bear River Bay of Great Salt Lake
The maximum daily design discharge is 0.25 MGD and the maximum monthly design discharge is 0.16 MGD for the facility.

Receiving Water

Per UAC R317-2-13.7.a, the designated beneficial uses of Blue Creek and tributaries, Box Elder County, from Bear River Bay, Great Salt Lake to Blue Creek Reservoir, are 2B, 3D and 4.

- *Class 2B - Protected for infrequent primary contact recreation. Also protected for secondary contact recreation where there is a low likelihood of ingestion of water or a low*

degree of bodily contact with the water. Examples include, but are not limited to, wading, hunting, and fishing

- *Class 3D - Protected for waterfowl, shore birds and other water-oriented wildlife not included in Classes 3A, 3B, or 3C, including the necessary aquatic organisms in their food chain.*

- *Class 4 - Protected for agricultural uses including irrigation of crops and stock watering. Site-specific total dissolved solids (TDS) criteria are associated with this use. Blue Creek and tributaries, Box Elder County, from Bear River Bay, Great Salt Lake to Blue Creek Reservoir: March through October daily maximum 4,900 mg/l and an average of 3,800 mg/l; November through February daily maximum 6,300 mg/l and an average of 4,700 mg/l. Assessments will be based on TDS concentrations measured at the location of STORET 4960740.*

Typically, the critical flow for the wasteload analysis is considered the lowest stream flow for seven consecutive days with a ten-year return frequency (7Q10). Flow data was insufficient to calculate the annual or seasonal 7Q10 values. The seasonal 20th percentile flow values were calculated using data from DWQ monitoring stations. For conservative effluent limits, a mass balance analysis was completed as discussed in the Wasteload Allocation Methods section. For this analysis, the upstream boundary condition was determined using monitoring location DWQ 4960740 BLUE CK AB MORTON-THIOKOL AT U83 to provide equivalent effluent discharge limits at full assimilative capacity for each of the three outfalls (ATK Outfall 002, Autoliv Outfall 001, and ATK Outfall 001). The seasonal 20th percentile and the overall flow values for the background receiving water are displayed in Table 1.

Table 1: Seasonal and Overall Average Flow Data for background monitoring location

Season	20th percentile Flow Data (cfs)
	DWQ 4960740
Summer	1.19
Fall	4.00
Winter	2.32
Spring	4.34
Overall	**2.40**

Effluent discharge data for each outfall source was characterized using data from the permit applications and the discharge monitoring reports (DMRs). Autoliv ASP Inc. Facility Monitoring Data Parameters provided in the 2020 permit application were interrogated. Autoliv has reported no discharges since the permit was issued on December 1, 2015 and so there is no DMR flow data available. The ATK Launch Systems, LLC effluent discharge data from outfalls 001 and 002 were collected from the DMR report. The design flow specifications provided in the applications were used to model effluent discharge from each outfall.

Ambient receiving water quality was characterized using data from the same DWQ monitoring

station described previously. For conservative effluent limits, the upstream boundary conditions at DWQ 4960740 BLUE CK AB MORTON-THIOKOL AT U83 XING were analyzed using a mass balance approach.

Effluent water quality was characterized using the data provided in the permit applications and DMRs. When data was not available, DWQ monitoring locations for each of the outfalls were used. Moving downstream, the effluent monitoring locations were: (ATK outfall 002) 4960780-THIOKOL 02 OUTFALL TO BLUE CK .4 MI S OF N BNDRY, (Autoliv outfall 001) 4960770-MORTON 01 EFFLUENT TO BLUE CREEK, and (ATK outfall 001) 4965070-THIOKOL 001 THIOKOL WWTP.

Total Maximum Daily Load (TMDL)

According to the Utah's 2022 303(d) Integrated Report on Water Quality, the receiving water for the discharge, Blue Creek (UT16020309-002_00) is impaired and listed as Not Supporting for boron, selenium, pH, E. coli, and total dissolved solids (TDS). Aluminum has been delisted in this report because the more recent monitoring data is sufficient and is now supporting. A site-specific standard for total dissolved solids was adopted for Blue Creek to address the impairment. The standard is as follows per UAC R317-2-14.1, Footnote (4).

> *Blue Creek and tributaries, Box Elder County, from Bear River Bay, Great Salt Lake to Blue Creek Reservoir: March through October daily maximum 4,900 mg/l and an average of 3,800 mg/l; November through February daily maximum 6,300 mg/l and an average of 4,700 mg/l. Assessments will be based on TDS concentrations measured at the location of STORET 4960740.*

Mixing Zone

The maximum allowable mixing zone is 15 minutes of travel time for acute conditions, not to exceed 50% of stream width, and for chronic conditions is 2500 ft, per UAC R317-2-5. Water quality standards must be met at the end of the mixing zone.

A tracer study was conducted in 1997 at Outfall 001 and the discharge was determined to be fully mixed 200 feet downstream from the discharge location (Moellmer 1997). Based on the results of the mixing zone modeling, plume width was 2.27 ft or 100.0% of the river at 1125.0 feet. A total of 100 % of the seasonal critical low flow was used to calculate chronic limits. Acute limits were calculated using 50% of the seasonal critical low flow.

Parameters of Concern

As stated previously, Blue Creek is impaired for dissolved aluminum, dissolved selenium, pH, and total dissolved solids. Other potential parameters of concern identified for the discharge/receiving water were total suspended solids (TSS), total dissolved solids (TDS), dissolved oxygen (DO), BOD5, nitrate/nitrite (NO3), total ammonia (TAN), dissolved metals, volatile organic compounds (VOC), and pH, as determined in consultation with the UPDES Permit Writer.

WET Limits

The percent of effluent in the receiving water in a fully mixed condition, and acute and chronic dilution in a not fully mixed condition are calculated in the WLA in order to generate WET limits.

The LC_{50} (lethal concentration, 50%) percent effluent for acute toxicity and the IC_{25} (inhibition concentration, 25%) percent effluent for chronic toxicity, as determined by the WET test, needs to be below the WET limits, as determined by the WLA. The WET limit for LC_{50} is typically 100% effluent and does not need to be determined by the WLA. Table 2 provides the WET limits for each of the three outfalls.

Table 2: WET Limits for IC_{25}

Outfall	Percent Effluent
ATK Outfall 002	9.4%
Autoliv Outfall 001	1.9%
ATK Outfall 001	18.4%

Wasteload Allocation Methods

Effluent limits were determined for conservative constituents using a simple mass balance mixing analysis (UDWQ, 2020). The mass balance approach was utilized to provide equivalent effluent discharge limits at full assimilative capacity in aggregate for each of the three outfalls into Blue Creek. The mass balance analysis is summarized in the Wasteload Appendix A.

The water quality standard for chronic ammonia toxicity is dependent on temperature and pH, and the water quality standard for acute ammonia toxicity is dependent on pH. The AMMTOX Model developed by University of Colorado and adapted by Utah DWQ and EPA Region VIII was used to determine ammonia effluent limits (Lewis et al., 2002). However, the seasonal acute and chronic freshwater total ammonia criteria were calculated based on UAC R317.2.14.2 assuming that fish early life stages (ELS) are present. The analysis is summarized in the Wasteload Appendix B.

For effluent selenium, if the water quality criterion can be achieved at end-of-pipe, that is generally considered not to cause or contribute to an impairment. Therefore, the effluent selenium limit is set to the water quality standard of 18.4 ug/L for 3D acute beneficial use.

Due to the lack of monitoring data, the effects of TP, TN, DO and BOD5 in the effluent on the DO in the downstream receiving waters was not assessed. It is presumed that secondary standards for BOD5 and minimum DO limits that match instream criteria would be sufficiently protective of the receiving water. Additional data should be collected during the permit cycle to support evaluation of compliance with the DO criteria.

Models and supporting documentation are available for review upon request.

Antidegradation Level I Review

The objective of the Level I ADR is to ensure the protection of existing uses, defined as the beneficial uses attained in the receiving water on or after November 28, 1975. No evidence is known that the existing uses deviate from the designated beneficial uses for the receiving water. Therefore, the beneficial uses will be protected if the discharge remains below the WQBELs presented in this wasteload.

A Level II Antidegradation Review (ADR) is not required for this facility. The proposed permits are a simple renewal of existing UPDES permits. No increase in effluent flow or concentration of pollutants over those authorized in the existing permits is being requested.

Documents:

WLA Document:	*Combined_Autoliv_ATK_WLA_2023.docx*
Wasteload Analysis and Addendums:	*Combined_Autoliv_ATK_WLA_2023.xlsx*
	Combined_Autoliv_ATK_AMMTOX_2023.xls

References:

Lewis, B., J. Saunders, and M. Murphy. 2002. Ammonia Toxicity Model (AMMTOX, Version2): A Tool for Determining Effluent Ammonia Limits. University of Colorado, Center for Limnology.

Moellmer, W.O. 1997. Blue Creek Dye Study Memorandum dated 10/20/1997. Utah Division of Water Quality.

Utah Division of Water Quality. 2020. *Utah Wasteload Analysis Procedures Version 2.0*.

WASTELOAD ANALYSIS [WLA] Date: 3/24/2023
Appendix A: Mass Balance Mixing Analysis for Conservative Constituents
Combined WLA for ATK and Autoliv

Discharger:	ATK Launch Systems, LLC	Autoliv ASP Inc., Promontory Point
Outfall:	001 & 002	001
Receiving Stream:	Blue Creek	
Stream Classification:	2B, 3D, 4	
Aquatic Life Class 3:	3D	
Agriculture Class 4:	Yes	
Direct Drinking Water Source:	No	
Important Fishery for Human Consumption:	No	
Season:	Annual	

Stream Flow:				
Acute:	1.20	cfs		
Chronic:	2.40	cfs		
Stream Hardness:	553	mg/l as CaCO3		

Effluent Flow:	ATK		Autoliv		Combined
Max. Daily	0.22	MGD	0.02	MGD	0.24
Ave. Monthly	0.11	MGD	0.01	MGD	0.12
Design	0.51	MGD	0.03	MGD	0.54
Effluent Hardness:	264	mg/l as CaCO3	(average of 4960780, 4960770, 4965070)		

Mixed Flow:				
Acute:	1.58	cfs	Dilution Fact. 3.19	
Chronic:	2.59	cfs	Dilution Fact. 12.77	
Mixed Hardness:	400	mg/l as CaCO3	Not to Exceed 400 mg/L	514.2

Aquatic Wildlife Criteria (Class 3 Waters)

Physical	Standard 30-Day Average	Standard Instantaneous	Upstream Concentration	Chronic Effluent Limit	Acute Effluent Limit
Dissolved Oxygen - Minimum (mg/L)	5.0	3.0		5.0	3.0
pH - Minimum		6.5			6.5
pH - Maximum		9.0			9.0

Chronic Metals, µg/L	Total Recoverable Standard	Conversion Factor	Dissolved Standard	Upstream Concentration	Dissolved Effluent Limit	Recoverable Effluent Limit
Aluminum[1]	87	1.000	87	14	N/A	N/A
Arsenic	150	1.000	150	35	1,618	1,618
Cadmium	0.76	0.851	0.64	0.13	7.20	8.46
Chromium III	268	0.860	231	6.4	3,094	3,598
ChromiumVI	11.0	1.000	11.0	6.4	69.7	69.7
Copper	30.5	0.960	29.3	4.1	351	365
Cyanide[2]	5.2	1.000	5.2	3.5	27.3	27.3
Lead	18.6	0.589	10.9	0.2	147.6	250.6
Mercury[2]	0.012	1.000	0.012	0.008	0.063	0.063
Nickel	169	0.997	168	6.7	2,228	2235
Selenium	4.6	1.000	4.6	6.1		CL[3]
Tributylin[2]	0.072	1.000	0.072	0.048	0.38	0.38
Zinc	388	0.986	382	19	5,029	5,100

Acute Metals, µg/L	Total Recoverable Standard	Conversion Factor	Dissolved Standard	Upstream Concentration	Dissolved Effluent Limit	Total Recoverable Effluent
Aluminum[3]	750	1.000	750	14		CL[3]
Arsenic	340	1.000	340	35	1314	1314
Cadmium	8.7	0.886	7.7	0.13	32.0	36.1
Chromium III	5612	0.316	1773	6.4	7,413	23,460
ChromiumVI	16.0	1.000	16.0	6.4	46.6	46.6
Copper	51.7	0.960	49.6	4.1	195	203
Cyanide	22.0	1.000	22.0	3.5	81.2	81.2
Iron	1000	1.000	1000	36	4,077	4,077
Lead	476.8	0.589	280.8	0.2	1,177	1,998
Mercury	2.400	1.000	2.400	0.008	10.036	10.036
Nickel	1516	0.998	1513	6.7	6,321	6334
Selenium	*18.4*	*1.000*	*18.4*	*6.1*	*18.4*	*18.4*
Silver	41.1	0.850	34.9	0.7	144	170
Tributylin	0.460	1.000	0.460	0.048	1.78	1.78
Zinc	388	0.978	379	19	1531	1565

1: Where the pH is equal to or greater than 7.0 and the hardness is equal to or greater than 50 ppm as $CaCO_3$ in the receiving water after mixing, the 87 ug/L chronic criterion (expressed as total recoverable) will not apply, and aluminum will be regulated based on compliance with the 750 ug/L acute criterion (expressed as total recoverable).

2: Background concentration assumed 67% of chronic standard.

3: Receiving segment listed as impaired for consituent without an approved TMDL; limit to be set based on capping current load.

Inorganics, µg/L	Chronic Standard	Acute Standard	Upstream Concentration	Chronic Effluent Limit	Acute Effluent Limit
Chlorine, Total Residual (TRC)	11.0	19.0	11.0	11.0	44.5
Hydrogen Sulfide (un-disassociated)		2.0	1.0		5.2
Phenol (Maximum)		0.10	0.05		0.26

Radiological pCi/l	Chronic Standard	Acute Standard	Upstream Concentration	Chronic Effluent Limit	Acute Effluent Limit
Gross Alpha		15.00	7.50		770.5

Organics, µg/L	Chronic Standard	Acute Standard	Upstream Concentration	Chronic Effluent Limit	Acute Effluent Limit
Acrolein	3.00	3.00	1.50	22.2	7.8
Aldrin		1.50	0.75		3.9
Chlordane	0.0043	1.20	0.0022	0.0318	5.0
Chlorpyrifos	0.041	0.083	0.02		0.28
DDT, DDE	0.0010	0.55	0.0005	0.0074	2.30
Diazinon	0.17	0.17	0.09		0.44
Dieldrin	0.056	0.24	0.028	0.414	0.92
Alpha-Endosulfan	0.056	0.11	0.028	0.414	0.37
Beta-Endosulfan	0.056	0.11	0.028	0.414	0.37
Endrin	0.036	0.086	0.018	0.266	0.303
Heptachlor	0.0038	0.26	0.0019	0.0281	1.08
Heptachlor epoxide	0.0038	0.26	0.0019	0.0281	1.08
Lindane	0.08	1.00	0.04	0.59	4.06
Methoxychlor		0.03	0.02		0.08
Mirex		0.001	0.0005		0.003
Nonylphenol	6.6	28.00	3.30		106.8
Parathion	0.013	0.066	0.007		0.26
PCB's	0.014		0.007	0.103	
Pentachlorophenol (varies with pH)	15.00	19.00	7.50	110.8	55.7
Toxaphene	0.0002	0.73	0.0001	0.0015	3.06

WET Limits, IC_{25}	Percent Effluent
ATK Outfall 001	18%
ATK Outfall 002	9%
Autoliv Outfall 001	2%

Agricultural Criteria (Class 4 Waters)

Constituent - Maximum	Unit	Standard	Upstream Concentration	Effluent Limit
Total Dissolved Solids[1]				
Maximum Daily: Mar - Oct	mg/l	4900	N/A	4900
Maximum Daily: Nov - Feb	mg/l	6300	N/A	6300
Average: Mar - Oct	mg/l	3800	N/A	3800
Average: Nov - Feb	mg/l	4700	N/A	4700
Arsenic	µg/L	100	50	369
Boron	µg/L	750	375	2769
Cadmium	µg/L	10	5	37
Chromium	µg/L	100	50	369
Copper	µg/L	200	100	738
Lead	µg/L	100	50	369
Selenium	µg/L	50	25	185

1: Site Specific Standard - Blue Creek and tributaries, Box Elder County, from Bear River Bay, Great Salt Lake to Blue Creek Reservoir: March through October daily maximum 4,900 mg/l and an average of 3,800 mg/l; November through February daily maximum 6,300 mg/l and an average of 4,700 mg/l.

Numeric Criteria for the Protection of Human Health from Consumption of Water and Fish

Parameter Maximum Conc., µg/L	Class 1C (Water and Organism)			Class 3 (Organism Only)	
Toxic Organics	**Standard**	**Upstream Concentration**	**Acute Effluent Limitation**	**Standard**	**Acute Effluent Limitation**
Antimony	5.6	2.8		640	2674
Arsenic					
Beryllium					
Cadmium					
Chromium III					
Chromium VI					
Copper	1300	650			
Lead					
Mercury					
Nickel	100	50		4600	19124
Selenium				4200	17607
Silver					
Thallium	0.24	0.12		0.47	1.59
Zinc	7400	3700		26000	97185
Cyanide	140	70		140	363
Asbestos (million fibers/L)	7	3.5			
2,3,7,8-TCDD Dioxin	5.00E-09	2.50E-09		5.1E-09	1.33996E-08
Acrolein	6	3		9	28.2
Acrylonitrile	0.051	0.0255		0.250	0.97
Alachlor	2	1			
Atrazine	3	1.5			
Benzene	2.2	1.1		51	210
Bromoform	4.3	2.15		140	580
Carbofuran	40	20			
Carbon Tetrachloride	0.23	0.115		1.6	6.3
Chlorobenzene	100	50		1600	6548
Chlorodibromomethane	0.4	0.2		13	53.9
Chloroethane					
2-Chloroethylvinyl Ether					
Chloroform	5.7	2.85		470	1961
Dalapon	200	100			
Di(2ethylhexl)adipate	400	200			
Dibromochloropropane	0.2	0.1			
Dichlorobromomethane	0.55	0.275		17	70.4
1,1-Dichloroethane					
1,2-Dichloroethane	0.38	0.19		37	155
1,1-Dichloroethylene	7	3.5		7100	29753
Dichloroethylene (cis-1,2	70	35			
Dinose	7	3.5			
Diquat	20	10			
1,2-Dichloropropane	0.5	0.25		15	62.1
1,3-Dichloropropene	0.34	0.17		21	87.5
Endothall	100	50			
Ethylbenzene	530	265		2100	7958
Ethylene Dibromide	0.05	0.025			
Glyphosate	700	350			
Haloacetic acids	60	30			
Methyl Bromide	47	23.5		1500	6213
Methyl Chloride					
Methylene Chloride	4.6	2.3		590	2466
Ocamyl (vidate)	200	100			
Picloram	500	250			
Simazine	4	2			
Styrene	100	50			
1,1,2,2-Tetrachloroethane	0.17	0.085		4	16.5
Tetrachloroethylene	0.69	0.345		3.3	12.7
Toluene	1000	500		15000	61286
1,2 -Trans-Dichloroethyle	100	50		10000	41762
1,1,1-Trichloroethane	200	100			
1,1,2-Trichloroethane	0.59	0.295		16	66.1
Trichloroethylene	2.5	1.25		30	122
Vinyl Chloride	0.025	0.0125		2.4	10.0
Xylenes	10000	5000			
2-Chlorophenol	81	40.5		150	500
2,4-Dichlorophenol	77	38.5		290	1093
2,4-Dimethylphenol	380	190		850	2957
2-Methyl-4,6-Dinitrophenol	13	6.5		280	1153
2,4-Dinitrophenol	69	34.5		5300	22108
2-Nitrophenol					
4-Nitrophenol					
3-Methyl-4-Chlorophenol					
Penetachlorophenol	0.27	0.135		3	0.0

Parameter Maximum Conc., µg/L	Class 1C (Water and Organism)			Class 3 (Organism Only)	
Toxic Organics	Standard	Upstream Concentration	Acute Effluent Limitation	Standard	Acute Effluent Limitation
Phenol	10000	5000		860000	3589297
2,4,6-Trichlorophenol	1.4	0.7		2.4	7.8
Acenaphthene	670	335		990	3081
Acenaphthylene					
Anthracene	8300	4150		40000	154439
Benzidine	0.000086	0.000043		0.0002	0.00070
BenzoaAnthracene	0.0038	0.0019		0.018	0.06939
BenzoaPyrene	0.0038	0.0019		0.018	0.06939
BenzobFluoranthene	0.0038	0.0019		0.018	0.06939
BenzoghiPerylene					
BenzokFluoranthene	0.0038	0.0019		0.018	0.06939
Bis2-ChloroethoxyMethane					
Bis2-ChloroethylEther	0.03	0.015		0.53	2.2
Bis2-Chloroisopropy1Ether	1400	700		65000	270256
Bis2-EthylhexylPhthalate	1.2	0.6		2.2	7.3
4-Bromophenyl Phenyl Ether					
Butylbenzyl Phthalate	1500	750		1900	5571
4-Chlorophenyl Phenyl Ether					
Chrysene	0.0038	0.0019		0.018	0.06939
Dibenzoa, (h)Anthracene	0.0038	0.0019		0.018	0.06939
1,2-Dichlorobenzene	420	210		1300	4779
1,3-Dichlorobenzene	320	160		960	3514
1,4-Dichlorobenzene	63	31.5		190	696
3,3-Dichlorobenzidine	0.021	0.0105		0.028	0.08386
Diethyl Phthalate	17000	8500		44000	157322
Dimethyl Phthalate	270000	135000		1100000	4180434
Di-n-Butyl Phthalate	2000	1000		4500	15673
2,4-Dinitrotoluene	0.11	0.055		3.4	14.1
2,6-Dinitrotoluene					
Di-n-Octyl Phthalate					
1,2-Diphenylhydrazine	0.036	0.018		0.2	0.78
Fluoranthene	130	65		140	379
Fluorene	1100	550		5300	20463
Hexachlorobenzene	0.00028	0.00014		0.00029	0.00077
Hexachlorobutedine	0.44	0.22		18	74.8
Hexachloroethane	1.4	0.7		3.3	11.6
Hexachlorocyclopentadiene	40	20		1100	4548
Ideno 1,2,3-cdPyrene	0.0038	0.0019		0.018	0.06939
Isophorone	35	17.5		960	3969
Naphthalene					
Nitrobenzene	17	8.5		690	2865
N-Nitrosodimethylamine	0.00069	0.000345		3	12.6
N-Nitrosodi-n-Propylamine	0.005	0.0025		0.51	2.1
N-Nitrosodiphenylamine	3.3	1.65		6	19.9
Phenanthrene					
Pyrene	830	415		4000	15444
1,2,4-Trichlorobenzene	35	17.5		70	238
Aldrin	0.000049	0.0000245		0.00005	0.00013
alpha-BHC	0.0026	0.0013		0.0049	0.01639
beta-BHC	0.0091	0.00455		0.017	0.05674
gamma-BHC (Lindane)	0.2	0.1		1.8	7.2
delta-BHC					
Chlordane	0.0008	0.0004		0.00081	0.00212
4,4-DDT	0.00022	0.00011		0.00022	0.00057
4,4-DDE	0.00022	0.00011		0.00022	0.00057
4,4-DDD	0.00031	0.000155		0.00031	0.00080
Dieldrin	0.000052	0.000026		0.000054	0.00014
alpha-Endosulfan	62	31		89	274
beta-Endosulfan	62	31		89	274
Endosulfan Sulfate	62	31		89	274
Endrin	0.059	0.0295		0.06	0.15736
Endrin Aldehyde	0.029	0.0145		0.3	1.2
Heptachlor	0.000079	0.0000395		0.000079	0.00021
Heptachlor Epoxide	0.000039	0.0000195		0.000039	0.000101247
Polychlorinated Biphenyls	0.000064	0.000032		0.000064	0.00017
PCB's					
Toxaphene	0.00028	0.00014		0.00028	0.00073

Summary - Dissolved Metals, µg/L

	Class 1C Human Health (Drinking Water Only)	Class 1C Human Health (Drinking Water + Organism)	Class 3 Human Health (Organism Only)	Class 3 Acute Aquatic Wildlife	Class 4 Agricultural	Acute Most Stringent
Aluminum				0		0
Antimony			2,674.0			2,674
Arsenic				1,313.6	369.2	369.2
Barium						0.0
Beryllium						0.0
Cadmium				32.0	36.9	32.0
Chromium (Total)					369.2	369.2
Chromium (III)				7,413		7,413
Chromium (VI)				46.6		46.6
Copper				194.9	738.4	194.9
Cyanide			0.0	81.2		0.0
Iron				4,077		4,077
Lead				1,176.6	369.2	369.2
Mercury				10.0		10.0
Nickel			19,124.3	6,321		6,321
Selenium			17,607.1	18.4	184.6	18.4
Silver				144.1		144.1
Thallium						0.00
Tributylin				1.8		1.78
Zinc				1,531.0		1531.0

Summary - Total Recoverable Metals, µg/L

	Chronic Total Recoverable Limits	Acute Most Stringent Dissolved Limits	Total Recoverable to Dissolved Fraction Conversion Factor	Acute Most Stringent Total Recoverable Limits
Aluminum	N/A	0	1.000	0
Antimony		2674.0		2,674.0
Arsenic	1618	369	1.000	369
Barium		0	1.000	0
Beryllium		0.0		0.0
Cadmium	8.5	32.0	0.886	36.1
Chromium (Total)		369		369
Chromium (III)	3598	7413	0.316	23,460
Chromium (VI)	70	47	1.000	47
Copper	365	195	0.960	203
Cyanide	27.3	0		0
Iron		4077	1.000	4,077
Lead	251	369	0.589	626.9
Mercury	0.063	10.0	0.850	11.8
Nickel	2234.8	6321	0.998	6,334
Selenium	CL3	18	1.000	18
Silver		144	0.850	170
Thallium		0.00		0.0
Tributyltin	0.38	1.78		1.8
Zinc	5100	1531	0.978	1,565

Total Recoverable to Dissolved Fraction Conversion Factor [Laboratory Correction Factor] EPA 823-B 96-007 June 1996

	Acute Factor	Chronic Factor
Aluminum	1.000	1.000
Antimony		
Arsenic	1.000	1.000
Barium	1.000	1.000
Beryllium		
Cadmium	0.886	0.851
Chromium III	0.316	0.860
Chromium VI	1.000	1.000
Copper	0.960	0.960
Cyanide		
Iron	1.000	1.000
Lead	0.589	0.589
Mercury	0.850	1.000
Nickel	0.998	0.997
Selenium	1.000	1.000
Silver	0.850	1.000
Thallium		
Tributyltin		
Zinc	0.978	0.986

WASTELOAD ANALYSIS [WLA] Date: ######
Appendix B: AMMTOX Model
Combined WLA for ATK and Autoliv

Discharging Facility: ATK Launch Systems, LLC & Autoliv ASP Inc., Promontory Point

Permit Flow [MGD]:	Max. Daily	Ave. Monthly
ATK Outfall 001	0.50	0.35
ATK Outfall 002	0.25	0.16
Autoliv Outfall 001	0.03	0.03

Receiving Water: Blue Creek
Stream Classification: 2B, 3D, 4
Stream Flows [cfs]: 2.4 All Seasons Critical Low Flow

Fully Mixed: NO
Acute River Width: 50%
Chronic River Width: 100%

Modeling Information

The modeling approach used in this analysis included a combination of the following models.

(1) AMMTOX Model, University of Colorado, Center of Limnology, and EPA Region 8

Coefficients used in the model were based, in part, upon the following references:

(1) Rates, Constants, and Kinetics Formulations in Surface Water Quality Modeling. Environmental Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Athens Georgia. EPA/600/3-85/040 June 1985.
(2) Principles of Surface Water Quality Modeling and Control. Robert V. Thomann, et.al. Harper Collins Publisher, Inc. 1987, pp. 644.

All model numerical inputs, intermediate calculations, outputs and graphs are available for review and comment at the Division of Water Quality.

Model Input

Current Upstream Information

Season	Critical Low Flow cfs	Temp. Deg. C	pH Ave	NH3 mg/L as N
Summer	2.4	22.7	8.62	0.04
Fall	2.4	3.9	8.38	0.08
Winter	2.4	3.2	8.09	0.05
Spring	2.4	15.4	8.36	0.12

Projected Discharge Information

ATK Outfall 001	Flow (MGD)		Temp.	pH
Season	Max Daily	Ave Monthly	Deg. C	Ave
Summer	0.089	0.35	21.0	7.95
Fall	0.089	0.35	9.2	8.14
Winter	0.089	0.35	6.2	7.76
Spring	0.089	0.35	14.8	7.82

ATK Outfall 002	Flow (MGD)		Temp.	pH
Season	Max Daily	Ave Monthly	Deg. C	Ave
Summer	0.135	0.16	20.9	8.07
Fall	0.135	0.16	14.5	7.77
Winter	0.135	0.16	7.2	7.90
Spring	0.135	0.16	14.9	8.00

Autoliv Outfall 001	Flow (MGD)		Temp.	pH
Season	Max Daily	Ave Monthly	Deg. C	Ave
Summer	0.03	0.03	30.7	7.80
Fall	0.03	0.03	40.2	6.90
Winter	0.03	0.03	24.7	7.77
Spring	0.03	0.03	0.0	0.00

Effluent Limitations

Current State water quality standards are required to be met under a variety of conditions including in-stream flows targeted to the 7-day, 10-year low flow (R317-2-9).
Other conditions used in the modeling effort reflect the environmental conditions expected at low stream flows.

Effluent Limitations for Protection of Aquatic Wildlife (Assumed Class 3D Waters)

Temperature (deg C)	Maximum
Instantaneous	27.0
Change	4.0

pH	Concentration
Minimum	6.5
Maximum	9.0

Ammonia-Total (mg/L)

	Chronic (30-day ave)			Acute (1-hour ave)		
Season	Standard	Background	Limit	Standard	Background	Limit
Summer	Varies	0.04	5.0	Varies	0.04	14.0
Fall	Varies	0.08	9.0	Varies	0.08	15.0
Winter	Varies	0.05	11.0	Varies	0.05	13.0
Spring	Varies	0.12	6.0	Varies	0.12	16.0