

NOTICE

All drawings located at the end of the document.



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4 May 1990

Mr. Gary Anderson
EG&G, Rocky Flats
Rocky Flats Plant
P.O. Box 464
Golden, Colorado 80402-0464

Subject: Rationale for ARAR Waiver Pertaining to
the Surface Water IM/IRA
WESTON Work Order No. 6029-51-01

Dear Mr. Anderson:

WESTON has assembled the following information to support justification for a proposed ARAR waiver pertaining to the surface water Interim Measures/Interim Remedial Action (IM/IRA) for surface water. Table 1 presents a summary of the constituents and their respective concentrations exceeding proposed ARARs for the seeps and other surface water stations where flow is intended for collection as part of the IM/IRA. Proposed ARARs are as defined in the final Phase II RFI/RIFS Work Plan for Operable Unit No. 2. The surface water stations include the 903 Pad Lip Site (SW-50, SW-51, SW-52, SW-55, SW-57, SW-58, and SW-77), SW-53, SW-63, SW-64, Upper South Walnut Creek (SW-56, SW-59, SW-60, SW-61, and SW-101), and SW-103. The surface water flows at the 903 Pad Lip Site will be collected at SW-55 and SW-77, and the flow in upper South Walnut Creek collected at SW-61. These particular stations receive flow from the other upstream stations within their respective groups. The data in Table 1 include the average and maximum concentrations at each station (or group of stations), the estimated flow at the stations (or groups of stations) based on a recent flow measurement (wet season), the flow weighted average concentration for all stations, and the flow weighted maximum concentrations. Flow weighted averaging is intended to define the probable influent average and maximum concentrations for these constituents for the IM/IRA treatment system. In preparation of this information, outliers have been removed from the data set to avoid skewing the data to the high side which is likely to be unrepresentative of the actual condition. Dixon's Test at the 95% confidence level was used to determine outliers. These outliers are shown in Table 2 for information purposes.

In review of Table 1, it can be seen that a number of organic and inorganic analytes occur above proposed ARAR at the various stations or groups of stations. The flow weighted average of the averages and maximums at the stations or groups of stations also indicates some of these constituents may exceed proposed ARAR in the influent to the treatment system. Because it has been mutually agreed among DOE and the regulatory agencies that the IM/IRA implementation be expedited (collection and treatment of surface water in 1990), it is prudent to evaluate whether it is necessary to meet all proposed ARARs for the IM/IRA to be effective at reducing the potential risk to the public health and environment. It is noted that, as with removal actions, interim actions need only meet ARARs to the greatest extent practicable given the exigencies of the circumstances (40 CFR 300.65(f)). Furthermore, given that the treated effluent ultimately flows to Pond B-5 where discharge is monitored and controlled in accordance with the Plant's NPDES permit, it is not probable that surface water exceeding the CDH surface water standards for Walnut Creek will pass the property boundary. With these considerations, the following observations and assessments are made with regard to Table 1:

ADMIN RECORD

A-0002-000289

REVIEWED FOR CLASSIFICATION/UCM
By [Signature]
Date 5/21/90



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1. There are a host of volatile organic compounds present, some of which are known carcinogens. Treatment to achieve ARARs for these constituents is a primary goal of the IM/IRA.
2. Plutonium, americium, and uranium, in both dissolved and total concentrations exceed ARAR. It is both prudent in terms of keeping activated carbon, if selected for treatment, from becoming radioactive, and in mitigating potential NPDES discharge problems at Pond B-5, that these radionuclides be removed to achieve ARAR.
3. A number of metals exceed ARAR (or TBC) in terms of total or dissolved concentrations. These metals include aluminum, iron, manganese, strontium, and to a lesser extent beryllium, cesium, molybdenum, selenium, and zinc. An ARAR waiver is requested for these metals for the following reasons:
 - a. Most of the aluminum, iron and manganese exist as particulates (dissolved aluminum does not exceed ARAR in the projected influent quality) and will be largely removed during suspended solids removal, a planned pretreatment process to protect downstream unit processes from fouling. For iron, and to a lesser extent manganese, this will achieve compliance with potential ARARs. Dissolved manganese will be removed to some extent by activated carbon (adsorption), air stripping (oxidation/precipitation), or UV peroxide (oxidation/precipitation), but there will be uncertainty as to the overall effectiveness of the removal process. The removal of these metals through suspended solids removal or by other mechanisms in downstream unit processes for organics removal is certain to mitigate non-compliance problems for the discharge at Pond B-5. Furthermore, iron and manganese ARARs are secondary drinking water standards (adopted as surface water standards for Walnut Creek), and are thus established for aesthetic purposes rather than for minimizing risks to the public health. Adding a unit process for the removal of these metals (and the others discussed below) will add to the cost, complexity of operation, and implementation time for the IM/IRA.
 - b. The standard for strontium is exceeded; however, the standard for strontium is TBC. Strontium is not an Appendix VIII constituent and background has been used to establish TBC. Strontium will not significantly exceed background if not removed from the influent, and there is no surface water standard for Walnut Creek for this metal.
 - c. Beryllium, cesium, and molybdenum are unlikely to exceed potential ARARs in the influent to the treatment system due to mixing of all surface water station flows. Surface water standards for these metals are not established for Walnut Creek, therefore if these metals are not removed, there will not be a NPDES non-compliance problem at Pond B-5.
 - c. The TDS potential ARAR may be exceeded at times; however, the TDS potential ARAR is a ground water protection standard, not a Walnut Creek in-stream standard.



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Lastly, it is noted that treatment for organics and radionuclides removes greater than 99% of the risk to the public health (see the Environmental Assessment for the 881 Hillside IM/IRA). It is also hypothesized in the Phase II RFI/RIFS Plan for Operable Unit No. 2, with reasonable confidence, that the above background metals and inorganics in ground water at Operable Unit No. 2, including uranium, is due to localized evaporative concentration. If such a natural phenomenon explains the apparently elevated concentrations of these constituents, treatment for their removal would be a futile and costly attempt at cleaning up the natural environment. Because an interim action need not meet all ARARs, it is logical that the potential ARARs established for the above noted constituents be waived at this time.

Sincerely,

ROY F. WESTON, INC.

A handwritten signature in cursive script that reads "Michael A. Anderson For".

Michael A. Anderson Ph.D., P.E.
Project Director

MAA/tms

cc: 2029-51-01

TABLE 2
ROCKY FLATS PLANT
SURFACE WATER DATA - DIXON TEST OUTLIERS*

<u>SURFACE WATER STATION</u>	<u>SAMPLE DATE</u>	<u>OUTLIER CONCENTRATION</u>
903 Pad and Lip Area:		
SW-55	10/19/89	[Li] _{total} = 3.2 mg/l
SW-55	05/25/89	[Am] _{total} = 7.2 mg/l
SW-55	06/28/89	[Pb] _{total} = 0.0576 mg/l
SW-55	06/28/89	[Sn] _{total} = 0.141 mg/l
SW-77	06/27/89	[Nitrate & Nitrite] = 24 mg/l
Upper South Walnut Creek:		
SW-56	04/13/89	[Be] _{dissolved} = 0.0053 mg/l
SW-56	04/13/89	[Acetone] = 130 µg/l
SW-59	07/06/89	[Li] _{total} = 2.56 mg/l
SW-59	07/06/89	[Zn] _{total} = 2.66 mg/l
SW-59	05/11/89	[Am] _{total} = 1.3 pCi/l
SW-60	08/03/89	TDS = 3300 mg/l
SW-101	05/11/89	[Ba] _{total} = 2.02 mg/l
SW-101	05/11/89	[Cr] _{total} = 0.212 mg/l
SW-101	05/11/89	[Co] _{total} = 0.132 mg/l
SW-101	05/11/89	[Cu] _{total} = 0.293 mg/l
SW-101	05/11/89	[Fe] _{total} = 204 mg/l
SW-101	05/11/89	[Pb] _{total} = 0.215 mg/l
SW-101	05/11/89	[Mn] _{total} = 3.68 mg/l
SW-101	05/11/89	[Mo] _{total} = 0.174 mg/l
SW-101	05/11/89	[Hg] _{total} = 0.0024 mg/l
SW-101	05/11/89	[Ni] _{total} = 0.246 mg/l
SW-101	05/11/89	[V] _{total} = 0.555 mg/l

TABLE 2 (cont.)
 ROCKY FLATS PLANT
 SURFACE WATER DATA - DIXON TEST OUTLIERS

<u>SURFACE WATER STATION</u>	<u>SAMPLE DATE</u>	<u>OUTLIER CONCENTRATION</u>
Upper South Walnut Creek (cont.):		
SW-101	05/11/89	[Gross Alpha] _{total} = 780 pCi/l
SW-101	05/11/89	[Gross Beta] _{total} = 570 pCi/l
SW-101	05/11/89	[Pu] _{total} = 3.3 pCi/l
SW-101	05/11/89	[Be] _{total} = 0.0572 mg/l
SW-101	05/11/89	[Cd] _{total} = 0.0142 mg/l
Other Stations:		
SW-53	08/15/89	[Fe] _{dissolved} = 8.54 mg/l
SW-53	06/26/89	[Fe] _{total} = 22.30 mg/l
SW-53	09/20/89	[Sb] _{dissolved} = 0.133 mg/l
SW-53	06/26/89	[Be] _{total} = 0.0055 mg/l
SW-53	06/23/88	[Pb] _{total} = 0.0623 mg/l
SW-53	06/26/89	[Sn] _{total} = 0.109 mg/l
SW-64	07/07/88	[Al] _{total} = 15.4 mg/l
SW-64	07/07/88	[Fe] _{total} = 17.1 mg/l
SW-64	06/27/89	[Carbon Disulfide] = 6 µg/l
SW-103	03/23/89	[Al] _{total} = 169 mg/l
SW-103	03/23/89	[Ba] _{total} = 4.23 mg/l
SW-103	03/23/89	[Cr] _{total} = .172 mg/l
SW-103	03/23/89	[Co] _{total} = .224 mg/l
SW-103	03/23/89	[Cu] _{total} = .213 mg/l
SW-103	03/23/89	[Fe] _{total} = 142 mg/l
SW-103	03/23/89	[Pb] _{total} = .656 mg/l
SW-103	03/23/89	[Mg] _{total} = 56.8 mg/l

TABLE 2 (cont.)
 ROCKY FLATS PLANT
 SURFACE WATER DATA - DIXON TEST OUTLIERS

<u>SURFACE WATER STATION</u>	<u>SAMPLE DATE</u>	<u>OUTLIER CONCENTRATION</u>	
Other Stations (cont.):			
SW-103	03/23/89	[Mn] _{total}	= 10.7 mg/l
SW-103	03/23/89	[Ni] _{total}	= .273 mg/l
SW-103	03/23/89	[V] _{total}	= .445 mg/l
SW-103	03/23/89	[Be] _{total}	= 0.0214 mg/l
SW-103	03/23/89	[Cd] _{total}	= 0.0241 mg/l
SW-103	06/15/89	[Pb] _{total}	= 0.116 mg/l

* The concentration data listed in Table 2 were identified as outliers by Dixon's Test at a 95% confidence level. Dixon's Test is a statistical procedure for determining the probability that datum would be observed if the data were normally distributed.

Dixon, W.J., 1953. Processing Data Outliers, Biometrics, v. 9, pp. 74-89.

TABLE 1
ROCKY FLATS PLANT
SURFACE WATER CONSTITUENTS: ABOVE POTENTIAL ARAR

ANALYTE	POTENTIAL ARAR	1 903 PAD AND LIP (Flow = 5 GPM)				2 SM053 UPPER SOUTH WALNUT CREEK (Flow = 38 GPM)				SM063 (Flow = .5 GPM)				SM064 (Flow = 0.5 GPM)				SM103 (Flow = 15 GPM)		FLOW WEIGHTED AVERAGE CONCENTRATION	FLOW WEIGHTED MAXIMUM CONCENTRATION
		C avg	C max	C avg	C max	C avg	C max	C avg	C max	C avg	C max	C avg	C max	C avg	C max	C avg	C max				

Volatile Organics																					
(Concentration Units = ug/l)																					
		3	4																		
Vinyl Chloride	2	5	10	5	10	6	15	5	10	5	10	5	10	5	10	5	10	5	10	6	13
Methylene Chloride	5U	4	6	4	9	7	44	3	5	5	9	5	9	5	9	5	9	5	9	6	31
1,1-Dichloroethene	7	27	140	3	5	10	143	3	5	3	5	3	5	3	5	3	5	3	5	9	104
1,1-Dichloroethane	5U	2	5	3	5	3	6	3	5	3	5	3	5	3	5	3	5	3	5	3	6
1,2-Dichloroethene (total)	5U	3	11	15	42	4	56	3	5	3	5	3	5	3	5	3	5	3	5	4	38
Carbon Tetrachloride	5	62	1005	3	5	76	605	10	17	3	5	3	5	3	5	3	5	3	5	7	474
Trichloroethene	5	132	2500	4	13	43	260	8	14	13	20	13	20	2	2	2	2	2	2	39	378
Tetrachloroethene	5U	15	65	3	5	50	280	2	5	3	5	3	5	2	2	2	2	2	2	34	185

Dissolved Metals																					
(Concentration Units = mg/l)																					
		C avg	C max	C avg	C max	C avg	C max	C avg	C max	C avg	C max	C avg	C max	C avg	C max	C avg	C max				
Iron (Fe)	0.300	0.1581	1.4800	1.5452	3.6900	0.0344	0.2000	0.0327	0.1000	0.0173	0.1000	0.0521	0.1560	0.0618	0.3241	0.0904	0.5769	0.0026	0.0058	0.2821	0.9577
Manganese (Mn)	0.050	0.2427	1.6400	0.4495	0.7060	0.0840	0.6430	0.4025	0.4120	0.0355	0.0740	0.0355	0.0730	0.0904	0.5769	0.0026	0.0058				
Selenium (Se)	0.010	0.0031	0.0134	0.0025	0.0050	0.0026	0.0050	0.0025	0.0050	0.0060	0.0130	0.0025	0.0050	0.0026	0.0058						
Strontium (Sr)	0.396	0.4180	0.9180	0.4389	0.8170	0.2678	1.1700	1.1600	1.2500	1.1075	1.1700	0.2110	0.4210	0.2821	0.9577						

TABLE 1 (CONT)
ROCKY FLATS PLANT
SURFACE WATER CONSTITUENTS: ABOVE POTENTIAL ARAR

ANALYTE	POTENTIAL ARAR	903 PAD AND LIP (Flow = 5 GPM)		SW053 (Flow = 0.5 GPM)		UPPER SOUTH WALNUT CREEK (Flow = 38 GPM)		SW063 (Flow = .5 GPM)		SW064 (Flow = 0.5 GPM)		SW103 (Flow = 15 GPM)		FLOW WEIGHTED AVERAGE CONCENTRATION	FLOW WEIGHTED MAXIMUM CONCENTRATION
		C avg	C max	C avg	C max	C avg	C max	C avg	C max	C avg	C max	C avg	C max		
Total Metals															
(Concentration Units = mg/l)															
Aluminum (Al)	5.000	4.4058	28.3000	1.7560	6.6200	4.5743	25.4000	0.7500	0.7500	0.7220	0.9980	9.0752	25.6000	5.6066	25.1241
Antimony (Sb)	0.060	0.0300	0.5000	0.0300	0.0600	0.0327	0.1020	0.0300	0.5000	0.0300	0.5000	0.0300	0.5000	0.0317	0.2421
Beryllium (Be)	0.005	0.0005	0.0069	0.0009	0.0055	0.0021	0.0572	0.0020	0.0020	0.0050	0.0050	0.0036	0.0214	0.0024	0.0426
Cesium (Cs)	1.000	1.0000	1.0000	2.5000	2.5000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.2220	1.1100	0.8081	1.0319
Iron (Fe)	1.000	3.6847	26.7000	6.1480	8.6200	3.7589	21.7000	0.2200	1.3200	0.9950	1.0700	19.0000	40.7000	7.5621	26.4555
Manganese (Mn)	1.000	0.1784	0.9540	0.5873	0.7190	0.2422	0.9470	0.4650	0.4650	0.1579	0.3680	1.1230	3.1800	0.4630	1.4997
Molybdenum (Mo)	0.100	0.0027	0.5000	0.1000	0.1000	0.0055	0.5000	0.0050	0.5000	0.1000	0.1000	0.0228	0.1140	0.0112	0.3918
Selenium (Se)	0.010	0.0032	0.0126	0.0025	0.0250	0.0030	0.0160	0.0110	0.0110	0.0055	0.0115	0.0025	0.0250	0.0030	0.0180
Strontium (Sr)	0.382	0.3138	0.8790	0.4575	0.8470	0.3073	1.3600	1.2500	1.2500	1.2333	1.3600	0.5650	2.2700	0.3898	1.5438
Zinc (Zn)	2.000	0.2829	2.8400	0.0243	0.1210	0.2927	1.1900	0.0150	0.0200	0.0830	0.1260	0.2622	0.7720	0.2778	1.1955
Dissolved Radionuclides															
(Concentration Units = pCi/l)															
Gross Alpha	11.00	2.800	5.670	4.700	8.480	5.200	20.600	8.250	8.250	6.340	6.340	1.000	8.030	3.971	15.851
Gross Beta	19.00	2.000	3.280	4.500	7.000	9.000	43.700	18.900	18.900	7.200	7.200	12.000	21.700	9.198	33.934
Plutonium 239, 240	0.05	0.400	1.060	1.000	1.890	0.008	0.108	0.005	0.075	0.005	0.005	0.005	0.005	0.048	0.176
Total Uranium	10.00	4.000	5.020	4.600	7.260	5.300	10.260	17.790	17.790	15.530	15.530	3.900	4.440	5.023	8.435

TABLE 1 (CONT)
 ROCKY FLATS PLANT
 SURFACE WATER CONSTITUENTS: ABOVE POTENTIAL ARAR

ANALYTE	POTENTIAL ARAR	1 903 PAD AND LIP (Flow = 5 GPM)		2 SW053 (Flow = 0.5 GPM)		UPPER SOUTH WALNUT CREEK (Flow = 38 GPM)		SW063 (Flow = .5 GPM)		SW064 (Flow = 0.5 GPM)		SW103 (Flow = 15 GPM)		FLOW WEIGHTED AVERAGE CONCENTRATION	FLOW WEIGHTED MAXIMUM CONCENTRATION
		C avg	C max	C avg	C max	C avg	C max	C avg	C max	C avg	C max	C avg	C max		
Total Radionuclides															
(Concentration Units = pci/l)															
Gross Alpha	11.00	87.000	259.000	125.000	230.000	51.000	310.000	34.000	34.000	34.000	34.000	26.000	53.000	47.773	235.328
Gross Beta	19.00	28.000	63.000	7.800	14.000	44.000	340.000	93.000	93.000	93.000	93.000	28.000	55.000	38.360	237.202
Plutonium 239, 240	0.05	17.000	60.000	20.000	56.000	0.310	3.100	0.005	0.005	0.123	0.123	0.480	1.400	1.918	7.848
Americium 241	0.05	0.110	1.100	9.500	28.000	0.078	0.440	0.005	0.010	0.010	0.010	0.140	0.330	0.174	0.692
Tritium	500.00	230.000	829.000	222.000	310.000	222.000	500.000	1100.000	1100.000	200.000	282.000	244.000	458.000	235.412	518.672
Total Uranium	10.00	4.500	18.100	5.200	8.470	6.000	16.600	20.500	20.500	13.000	23.590	3.900	7.330	5.518	14.412
Dissolved Inorganics															
(Concentration Units = mg/l)															
Total Dissolved Solids	400	479	790	534	666	385	682	663	675	694	720	406	490	404	643

1 The 903 Pad and Lip area contains surface water stations SW050, SW051, SW052, SW055, SW057, SW058 AND SW077.

2 Upper South Walnut Creek contains surface water stations SW056, SW059, SW060, SW061 AND SW101.

3 C avg = Average Analyte Concentration

4 C max = Maximum Analyte Concentration