Appendix 3: Company Reports/Studies Supplied to and Used by the Task Group

A3.1 Repeat-dose toxicity studies

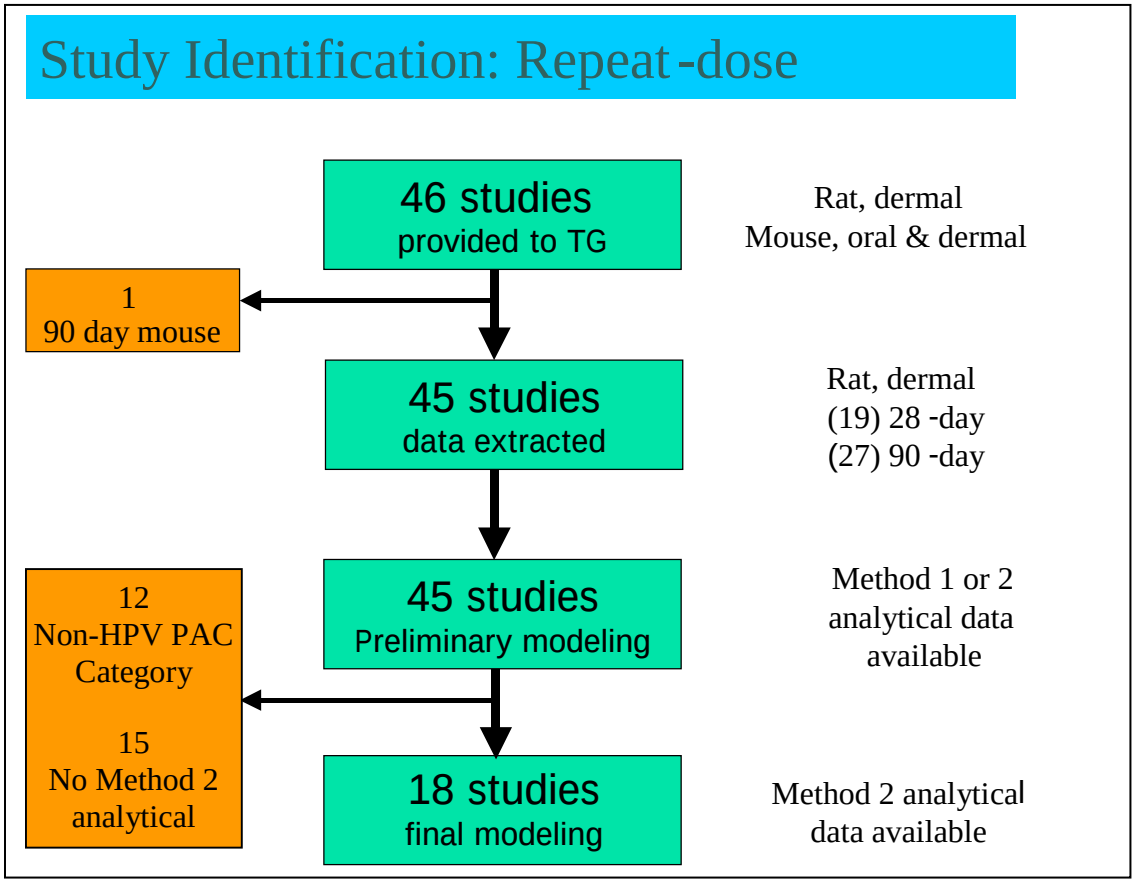
A list of the laboratory reports of repeat-dose studies supplied to the TG is shown in **Table 3A-5** on page 7 of this appendix. The entries for studies used in the final modeling evaluation appear boldfaced and highlighted. The table also contains a brief note explaining why selected studies were not used in the final modeling effort.

A subsection discussing the number of repeat-dose data points available for modeling can be found in **Section 3A-3** of this appendix.

The number of repeat-dose toxicity studies available at each stage of this project is shown in **Table 3A-1**.

Table 3A-1. Availability of Repeat-dose Toxicity Studies

Laboratory Reports received	46
Studies received	46
Studies from which data were extracted	45
Studies used for preliminary modeling	45
Studies used for final modeling	18



All but one of the forty-six (**46)** repeat-dose toxicity studies provided to the TG had been carried out in rats exposed via the dermal route, the exception being a 90-day study in mice performed using both the oral and dermal routes of exposure. The TG decided not to use this study (# 63563) in their evaluations since it was the only study conducted in mice.

The TG extracted data from the remaining forty-five (**45**) dermal repeat-dose studies.

Of the forty-five (**45**) dermal repeat-dose studies from which data were extracted, none were excluded from the preliminary modeling effort on the basis of inadequate analytical data, i.e. Method 1 or 2 data were available for all forty-five (**45**) studies. Thus, forty-five (**45**) dermal repeat-dose studies were used in the preliminary modeling effort.

For a toxicity study to be used in the final modeling, the sample used in the study had to have accompanying Method 2-derived analytical data and be a material that was judged to have a initial boiling point (BP) greater than 300 °F. Twenty-seven (**27**) dermal repeat-dose studies were eliminated because the samples tested did not meet these two criteria. Thus, the data from eighteen (**18**) dermal repeat-dose studies were used in the final modeling efforts.

A3.1.1 Exclusion of dose groups within repeat-dose studies

The repeat-dose studies identified as being available for use in modeling were evaluated to determine if any individual dose groups should be excluded from the modeling exercise. Four repeat-dose dose groups were subsequently excluded on the basis of small group size due to high mortality (50-90%). Because the modeling weighted each data point (dose group) equally, it was important to exclude data points that were based on an inadequate amount of data, i.e. small group size. Furthermore, the high mortality in these four groups is an indication that the MTD (maximum tolerated dose) in these animals had been reached or surpassed. The purpose of the selection criterion was to identify data appropriate for the analysis of the relationship of PAC content and *sensitive* repeat-dose endpoints, i.e. the effects that were observed at the lowest doses. For this purpose, data points in the range of <50% premature mortality were more useful than data points in the range of >50% premature mortality, which were at or above the MTD. In short, exclusion of data based on a small group size provided a more scientifically defensible basis for modeling the data at the lower end of the dose-response curve. See **Table 3A-6** for a list of the four excluded dose groups.

A3.2 Developmental toxicity studies

A list of the laboratory reports of developmental studies supplied to the TG is shown in **Table 3A-7** on page 10 of this appendix. The entries for studies used in the final modeling evaluation are boldfaced and highlighted. The table also contains a brief note explaining why selected studies were not used in the final modeling effort.

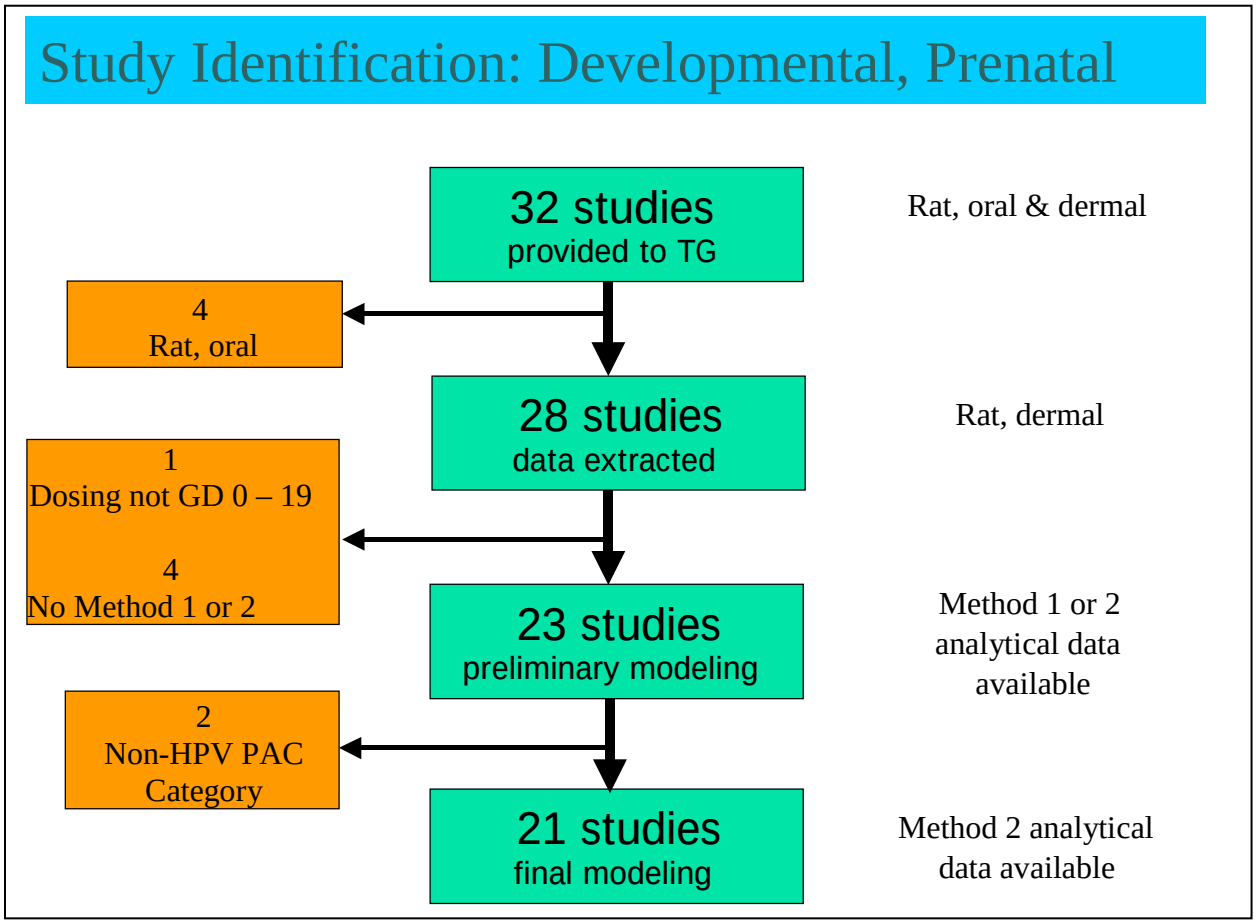
A subsection discussing the number of developmental data points available for modeling can be found in **Section 3A-3** of this appendix.

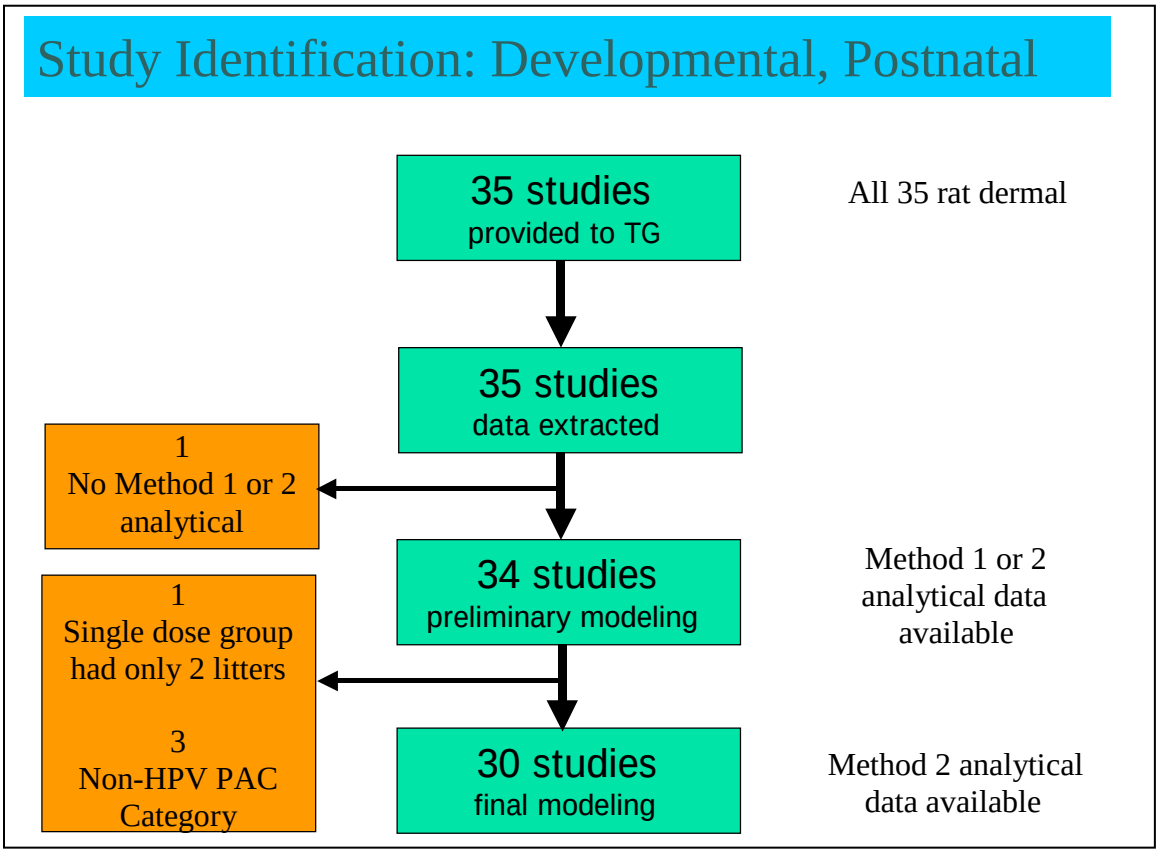
The number of developmental toxicity studies available at each stage of this project is shown in **Table 3A-2**.

Table 3A-2. Availability of Developmental Toxicity Studies

	Prenatal Studies[a]	Postnatal Studies[a]	Total
Reports received	25 (+7)[b]	28 (+7)[b]	60[c]
Studies received	32	35	67
Studies from which data were extracted	28	35	63
Studies used for preliminary modeling	23	34	57
Studies used for final modeling	21	30	51

[a] Prenatal studies - pregnant females exposed during gestation, caesarean section on day 20 of gestation
Postnatal studies - pregnant females exposed during gestation, dams allowed to deliver and pups monitored through day 4 of lactation.
[b] Seven developmental toxicity reports included both a prenatal and a postnatal study.
[c] Sixty-three reports were supplied to the TG. Three of the sixty-three reports did not contain information on developmental toxicity studies and were therefore excluded.





A3.2.1 Prenatal studies

Thirty-two (**32**) prenatal developmental toxicity studies were provided to the TG. In four of the studies, pregnant rats had been exposed via the oral route. Two of the oral studies (# 65370 and 65371) were unique in that single oral doses of 2000 mg/kg of five different test materials were administered only on gestation day 13 (GD 13). The other two oral studies (#63122 and 63123) involved administration of single doses of a test material on selected days of gestation. Because

of the limited number of oral studies with comparable dosing regimens, the Task Group agreed that:

- data should not be extracted from any studies in which the test material was administered orally, and
- data only from studies using the dermal route of exposure should be extracted and used to develop predictive models.

After excluding the four (**4**) oral prenatal toxicity studies, data was extracted from all remaining twenty-eight (**28**) studies.

The dosing period was not the same in all twenty-eight (**28**) dermal prenatal studies from which data was extracted. To ensure the modeling results were comparable, the TG decided to use only data from studies that included daily dosing on GD 0-19, as a minimum. For example, studies with dosing on GD 0-19 or GD 0-20 were included in the modeling. Also, studies involving dosing from premating day 7 through GD 20 were included. However, studies with dosing for a shorter interval than GD 0-19 were not used in the modeling, e.g. a group dosed on GD 9-12 was not included. If a dose group from a study was dosed on GD 9-12, and the other groups in the same study were dosed on GD 0-19, only the GD 9-12 group was excluded. If a dose group was administered the test material every other day, the dose group was not included (see **Section A3.2.3** "Exclusion of dose groups within developmental studies" for more details about the criteria considered when excluding specific dose groups).

Of the twenty-eight (**28**) dermal prenatal studies from which data were extracted, the data from one (#62492) was not used in modeling because all groups were administered the test material on only GD 9-12. This left data from twenty-seven (**27**) dermal prenatal studies in which one or more test groups were administered the test material for a sufficient period of time for use in modeling (i.e. GD 0-19 as a minimum).

Among these twenty-seven (**27**) dermal prenatal studies, four (#40694, 51841, 62494, ATX-890050) were excluded from the preliminary modeling effort on the basis of inadequate analytical data, i.e. neither Method 1 nor 2 data were available. Thus, twenty-three (**23**) dermal prenatal studies from which data had been extracted were used in the preliminary modeling effort.

For a toxicity study to be used in the final modeling, the sample used in the study had to have accompanying Method 2-derived analytical data and be a material that was judged to have a boiling point (BP) greater than 300 °F. Two (**2**) dermal prenatal studies were eliminated because the samples tested did not meet the boiling point criteria. Thus, the data from twenty-one (**21**) dermal prenatal studies were used in the final modeling efforts.

A.3.2.2 Postnatal studies

Thirty-five (**35**) postnatal developmental toxicity studies were provided to the TG. All thirty-five (**35**) postnatal studies used the dermal route of exposure, so none were excluded based on dose route.

Data was extracted from all thirty-five (**35**) postnatal studies.

All thirty-five (**35)** dermal postnatal studies from which data had been extracted had one or more test groups that were administered the test material for what was judged an appropriate period of time for modeling (i.e. GD 0-19 as a minimum). Consequently, none of the thirty-five (**35**) postnatal studies from which data had been extracted were eliminated due to an insufficient period of dosing. Within these thirty-five (35) studies, individual dose groups were excluded if the dosing period was inadequate (see **Section A3.2.3** "Exclusion of dose groups within developmental studies" for more details about the criteria considered when excluding specific dose groups).

Among the thirty-five (**35**) dermal postnatal studies from which data had been extracted, one (#62494) was excluded from use in the preliminary modeling effort due to inadequate analytical data, i.e. neither Method 1 nor 2 data were available. Thus, thirty-four (**34**) dermal postnatal studies from which data had been extracted were used in the preliminary modeling effort.

Of the thirty-four (**34**) dermal postnatal studies used in the preliminary modeling effort only thirty (30) were used in the final modeling effort. Of the four (4) studies not used, study #62884 was eliminated from the final modeling effort because its single dose group had only two litters (see **Section A3.2.3** "Exclusion of dose groups within developmental studies" for more details about the criteria considered when excluding specific dose groups). The other three (3) studies not used were eliminated because the test samples could not be characterized as having boiling points greater than 300 °F. Consequently, data from thirty (**30**) postnatal studies were used in the final modeling.

A3.2.3 Exclusion of dose groups within developmental studies

Once the developmental studies to be used in modeling were identified, the studies were evaluated to determine if selected dose groups should be excluded from the modeling exercise. The sixty-five (65) dose groups subsequently excluded fell into four general categories:

Duration of dosing

All fifty-six (56) of the developmental studies selected for final modeling had some dose groups in which dosing had been conducted on GD 0-19 as a minimum. However, in a number of the studies, individual dose groups had not been administered test material on the minimum number of days, GD0-19. To ensure the modeling results were comparable, the TG decided to use only data from dose groups that included daily dosing on GD 0-19 as a minimum. Applying the duration of dosing criterion eliminated thirty four (**34**) dose groups in the prenatal studies and seven (**7**) dose groups in the postnatal studies (See **Table 3A-8** for a listing of the specific dose groups).

Duplicate control groups

Several of the developmental studies had two control groups: (1) a remote control group and (2) a proximal control group. In all studies with two control groups, the Task Group chose to use the remote control group for modeling. The remote control group was housed in a different animal room than the exposed animals in order to avoid inhalation exposure to the test material. The proximal control group, which was housed in the same animal room as the exposed animals, was excluded from modeling since this control group may have had some inadvertent or indirect inhalation exposure to the test material. Applying the duplicate control group criterion eliminated six (**6**) dose groups in the prenatal studies and zero (**0**) dose groups in the postnatal studies (See **Table 3A-8** for a listing of the specific dose groups).

Small group size

Of the developmental toxicity studies available for use in the modeling exercise, the number of mated females per group ranged from 10-25 and 8-20 in the prenatal and postnatal studies, respectively. Because the modeling weighted each data point (dose group) equally, it was important to exclude data points that were based on an inadequate amount of data, i.e. small group size. The variability associated with data points based on such small group sizes is typically greater than that based on larger group sizes. Consequently, there is less confidence and greater uncertainty associated with data points based on small group sizes. Without the exclusion based on group size, the slope of the modeled curve could have been based heavily on a single data point representing only one or two litters. Therefore, group sizes with three or fewer dams with viable fetuses (prenatal endpoints) or litters (postnatal endpoints) were considered insufficient and excluded from the modeling and statistical analyses. The vast majority of data points used in the modeling were based on group sizes of 10-20 litters. In actuality, there were no data points with a group size of three and only one data point with a group size of four. A small number of postnatal data points were excluded because the group size was three or less.

In most cases, small group size was due to a high incidence of fetal resorptions where most fetuses and litters were completely lost. In excluding such data, there was no intent to “hide an effect.” In fact, it was clear that some of the tested streams were lethal to all or nearly all offspring, usually at the highest dose tested. The purpose of the selection criterion was to identify data appropriate for the analysis of the relationship of PAC content and *sensitive* developmental endpoints, i.e. the effects that were observed at the lowest doses. The goal of the modeling and statistical evaluation was to accurately predict the low, not the high, end of the dose-response curve (i.e. sensitive endpoints). In the case of resorptions, the goal was to accurately model dose levels that produced 10, 15, or 20% resorptions. For this purpose, data points in the range of 0-80% resorptions were more useful than data points in the range of 90-100% resorptions, which were at or near the maximal response. In short, exclusion of data based on a small group size provided a more scientifically defensible basis for modeling

the data at the lower end of the dose-response curve. Conversely, if one were interested in studying the effect on resorptions at the high end of the dose-response curve, it would be important to include these data.

Applying the group size criterion eliminated four (**4**) dose groups in the prenatal studies and thirteen (**13**) dose groups in the postnatal studies (See **Table 3A-8** for a listing of the specific dose groups). Two of the thirteen postnatal dose groups excluded comprised all the dose groups in study #62884, thus eliminating the study from modeling.

Study Design
A single dose group in one of the prenatal studies was designed to include residue analyses of selected tissues. Because of the unique objectives of this dose group, it was excluded from the modeling effort (See **Table 3A-8** for a listing of the specific dose group).

A3.3 Number of data points available for modeling

The number of data points available for preliminary and final modeling of each endpoint are shown in Tables **A6.2 and A6.3** in **Appendix 6**, respectively.

Table 3A-3. Number of Data Points Used in Preliminary Modeling

	Compositional Data Set			
	Method 1 (1-5 Ring Aromatics)	**Method 2 (1-7 ring Aromatics)**	**S-PAC[e]**	**Method 5 (Carbazoles)**
Endpoint	n[b]	n[b]	n[b]	n[b]
Repeat-dose				
Liver weight (relative[a])	102	124	82	8
Thymus weight (absolute)	70	92	68	8
RBC count	104	128	86	10
Platelet count	96	112	76	8
Hemoglobin concentration.	104	128	86	10
Hematocrit	104	128	86	10
Developmental (Postnatal)				
Total pups/litter PND[c] 0	72	77	57	79
Live pups/litter PND[c] 0	72	77	57	79
Pup body weight Day 0	72	77	57	79
Developmental (Prenatal)				
Percent resorptions	55	66	52	53
Resorptions/litter	55	66	52	53
Live fetuses/litter	55	66	52	53
Fetal body weight	55	66	52	53
Maternal thymus weight (absolute)[d]	28	35	28	0

[a] relative to body weight
[b] number of data points (dose groups)
[c] postnatal day
[d] maternal thymus weights were recorded in a limited number of studies
[e] obtained using Method 1 analytical techniques

Table 3A-4. Number of Data Points Used in Final Modeling

Endpoint	Number of data points (dose groups)[d]
Repeat-dose	
Liver weight (relative[a])	111
Thymus weight (absolute)	91
Platelet count	99
Hemoglobin concentration.	112
Developmental (Postnatal)	
Total pups/litter PND[b] 0	65
Live pups/litter PND[b] 0	65
Pup body weight Day 0	65
Developmental (Prenatal)	
Percent resorptions	67
Live fetuses/litter	67
Fetal body weight	67
Maternal thymus weight (absolute)	34[c]

[a] relative to terminal body weight
[b] postnatal day
[c] maternal thymus weights were recorded in a limited number of studies
[d] with accompanying Method 2 analytical data

A.3.4 Compositional studies

A list of compositional studies supplied to the TG is shown in **Table 3A-9** on page 17 of this appendix. The entries for studies used in the final modeling evaluation appear boldfaced and highlighted.

Table 3A-5. Repeat-dose Toxicity Studies Provided to the TG

Study No.	Report Title CAS No. HPV Category	Sample No.	Data Extracted	Used in Final Model
1451-81	13-Week Toxicity Study by Dermal Application of Metalworking Fluid Components to Rats CAS No. 64742-65-0 HPV Category: Lube basestock	89040	Yes	No – No Method 2 data
20525	**13-Week Toxicity Study by Dermal Application of Clarified Slurry Oil (CSO) to Rats** **CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil**	**86001**	**Yes**	**Yes**
20535	**13-Week Dermal Administration of Light Cycle Oil to Rats** **CAS No. 64741-59-9 HPV Category: Gas Oil**	**8281**	**Yes**	**Yes**
30237	**13-Week Dermal Administration to Rats of a 100" Solvent-Refined, Paraffinic Neutral Oil Dewaxed by the ********** **CAS No. 64742-65-0 HPV Category: Lube Basestock**	**82191**	**Yes**	**Yes**
50381	13-Week Dermal Administration of Light Catalytically Cracked Naphtha (LCCN) to Rats CAS No. 64741-55-5 HPV Category: Gasoline Blend	84152	Yes	No – Outside HPV PAC Categories[a]
50391	**13-Week Dermal Administration of ****** Heavy Coker Gas Oil to Rats** **CAS No. 64741-81-7 HPV Category: Heavy Fuel Oil**	**83366**	**Yes**	**Yes**
61590	**13-Week Dermal Administration of Heavy Vacuum Gas Oil to Rats** **CAS No. 64741-57-7 HPV Category: Heavy Fuel Oil**	**85244**	**Yes**	**Yes**
61737	**13-Week Dermal Administration of Furfural Extract to Rats** **CAS No. 64742-04-7 HPV Category: Aromatic Extract**	**86187**	**Yes**	**Yes**
61996	**13-Week Dermal Administration of ****** Coker Light Gas Oil to Rats** **CAS No. 64741-82-8 HPV Category: Gas Oil**	**87213**	**Yes**	**Yes**
62239	13-Week Dermal Administration of Four Bright Stock Extracts (BSEs) to Rats CAS No. 64742-10-5 HPV Category: Aromatic Extract	87476	Yes	No – B(a)P only
62260	13-Week Dermal Administration of Four Bright Stock Extracts (BSEs) to Rats CAS No. 64742-10-5 HPV Category: Aromatic Extract	86525	Yes	No – No Method 2 data
62261	13-Week Dermal Administration of Four Bright Stock Extracts (BSEs) to Rats CAS No. 64742-10-5 HPV Category: Aromatic Extract	87293	Yes	No – No Method 2 data
62262	13-Week Dermal Administration of Four Bright Stock Extracts (BSEs) to Rats CAS No. 64742-10-5 HPV Category: Aromatic Extract	87058	Yes	No – No Method 2 data
62326	**13-Week Dermal Administration of Vacuum Tower Overheads to Rats** **CAS No. 64741-49-7 HPV Category: Gas Oil**	**86270**	**Yes**	**Yes**
62710	**13-Week Dermal Administration of Syntower Bottoms to Rats** **CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil**	**86484**	**Yes**	**Yes**
62724	13-Week Dermal Administration of Vacuum Tower Bottoms to Rats CAS No. 64741-56-6 HPV Category: Asphalt	86268	Yes	No – No Method 2 data
63036	13-Week Dermal Administration of API separator bottom sludge CAS No. None HPV Category: Waste	88614	Yes	No – Outside HPV PAC Categories[a]
63237	**13-Week Dermal Administration of Visbreaker Gas Oil to Rats** **CAS No. 64741-81-7 HPV Category: Heavy Fuel Oil**	**86193**	**Yes**	**Yes**
63266	**13-Week Dermal Administration of DAF Float Blend to Rats** **CAS No. 68477-27-0 HPV Category: Waste**	**89106**	**Yes**	**Yes[b]**

Table 3A-5 (cont.). Repeat-dose Toxicity Studies Provided to the TG

Study No.	Report Title CAS No. HPV Category	Sample No.	Data Extracted	Used in Final Models
63456	**13-Week Dermal Administration of Heavy Atmospheric Gas Oil to Rats** **CAS No. 68915-97-9 HPV Category: Gas Oil**	**86271**	**Yes**	**Yes**
63563	Oral and Dermal Administration of Clarified Slurry Oil (CSO) to Male C3H Mice CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil	86001	No	No - Mouse study
63834	**13-Week Dermal Administration of ****** Light to Rats** **CAS No. 8002-05-9 HPV Category: Crude Oil**	**89645**	**Yes**	**Yes**
63846	**13-Week Dermal Administration of ****** Heavy to Rats** **CAS No. 8002-05-9 HPV Category: Crude Oil**	**89646**	**Yes**	**Yes**
64002	13-Week Dermal Administration of Visbreaker Residue to Rats CAS No. 64741-80-6 HPV Category: Heavy Fuel Oil	86192	Yes	No – No Method 2 data
64165	**13-Week Dermal Administration of ****** Heavy Coker Gas Oil to Rats-2** **CAS No. 64741-81-7 HPV Category: Heavy Fuel Oil**	**86181**	**Yes**	**Yes**
64184	**13-Week Dermal Administration of ****** Heavy Coker Gas Oil to Rats-3** **CAS No. 64741-81-7 HPV Category: Heavy Fuel Oil**	**86272**	**Yes**	**Yes**
ATX-860007	Twenty-Eight Day Dermal Toxicity Study in Rats on ****** Carbon Black Oil CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil	F-73-01	Yes	No – No Method 2 data
ATX-890077	28 Day Dermal Toxicity in Rats CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil	F-115-01	Yes	No – No Method 2 data
ATX-900026	28 Day Dermal Toxicity Study in Rats CAS No. 64741-75-9 HPV Category: Heavy Fuel Oil	F-127	Yes	No – No Method 2 data
ATX-900034	28 Day Dermal Toxicity Study in Rats Administered Test Article F-128-01 CAS No. 64741-57-7 HPV Category: Heavy Fuel Oil	F-128-01	Yes	No – No Method 2 data
ATX-900042	28 Day Dermal Toxicity Study in Rats CAS No. None HPV Category: Unidentified	F-129	Yes	No – Outside HPV PAC Categories[a]
ATX-900050	28 Day Dermal Toxicity Study in Rats CAS No. 64741-43-1 HPV Category: Gas Oil	F-130	Yes	No – No Method 2 data
ATX-900058	28 Day Dermal Toxicity Study in Rats CAS No. 64742-81-0 HPV Category: Kerosine	F-131	Yes	No – Outside HPV PAC Categories[a]
ATX-900066	28 Day Dermal Toxicity Study in Rats CAS No. 64741-45-3 HPV Category: Heavy Fuel Oil	F-132	Yes	No – No Method 2 data
ATX-900082	28 Day Dermal Toxicity Study in Rats CAS No. 64741-61-3 HPV Category: Heavy Fuel Oil	F-134	Yes	No – No Method 2 data

Table 3A-5 (cont.). Repeat-dose Toxicity Studies Provided to the TG

Study No.	Report Title CAS No. HPV Category	Sample No.	Data Extracted	Used in Final Models
ATX-910012	**90-Day Dermal Toxicity Study in Rats Administered Test Article F-179** **CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil**	**F-179**	**Yes**	**Yes**
ATX-910062	28 Day Dermal Toxicity Study in Rats CAS No. 64741-68-0 HPV Category: Gasoline Blend	F-184	Yes	No – Outside HPV PAC Categories [a]
ATX-910070	28 Day Dermal Toxicity Study in Rats CAS No. 64742-82-1 HPV Category: Gasoline Blend	F-185	Yes	No – Outside HPV PAC Categories [a]
ATX-910078	28 Day Dermal Toxicity Study in Rats CAS No. None (Light naphtha) HPV Category: Gasoline Blend	F-186	Yes	No – Outside HPV PAC Categories [a]
ATX-910086	28 Day Dermal Toxicity Study in Rats CAS No. None (Light naphtha) HPV Category: Gasoline Blend	F-187	Yes	No – Outside HPV PAC Categories [a]
ATX-910094	28 Day Dermal Toxicity Study in Rats CAS No. 64741-77-1 HPV Category: Gas Oil	F-188	Yes	No – No Method 2 data
ATX-910143	28 Day Dermal Toxicity Study in Rats Administered Test Article F-202 CAS No. None HPV Category: Unidentified	F-202	Yes	No – Outside HPV PAC Categories [a]
ATX-910233	**28 Day Dermal Toxicity Study in Rats** **CAS No. 64741-86-2 HPV Category: Gas Oil**	**F-233**	**Yes**	**Yes**
ATX-910257	28 Day Dermal Toxicity Study in Rats Administered Test Article F-236 CAS No. None HPV Category: Unidentified	F-236	Yes	No – Outside HPV PAC Categories [a]
ATX-920056	28 Day Dermal Toxicity Study in Rats Administered Test Article F-250 CAS No. 68783-12-0 HPV Category: Gasoline Blend	F-250	Yes	No – Outside HPV PAC Categories [a]
ATX-920064	28 Day Dermal Toxicity Study in Rats CAS No. 64741-41-9 HPV Category: Gasoline Blend	F-251	Yes	No – Outside HPV PAC Categories

[a] Boiling point of material below 300°F or sample information insufficient to assess BP >300°F
[b] No BP data, but analytical report 63786 cites procedures used on materials boiling above 400°F

Table 3A-6. Repeat-dose Study Dose Groups Excluded from Modeling

Study No.	Sample No./CRU No.	Dose Levels (mg/kg)	Sex	Reason Why Dose Group Excluded
20525	10298102	125	Male	**Low group n due to high mortality**
20525	10298102	500	Male	**Low group n due to high mortality**
20525	10298102	500	Female	**Low group n due to high mortality**
62710	86484	125	Female	**Low group n due to high mortality**

Table 3A-7. Developmental and Reproductive Toxicity Studies Provided to the TG

Study No.	Prenatal/ Postnatal[a]	Report Title CAS No. HPV Category	Sample No.	Data Extracted	Used in Final Models
40694	Prenatal	Spent Gas Oil Range-Finding Developmental Toxicity Study in Rats CAS No. None given HPV Category: Waste	84095	Yes	No – Outside HPV PAC Categories[a]
50341	Prenatal	Developmental Toxicity Screen in Rat Exposed Dermally to Light Catalytically Cracked Naphtha (LCCN) CAS No. 64741-55-5 HPV Category: Gasoline Blend	86045	Yes	No – Outside HPV PAC Categories[a]
50431	**Prenatal**	**Developmental Toxicity Screen in Rats Exposed Dermally to Heavy Coker Gas Oil-2 CAS No. 64741-81-7 HPV Category: Heavy Fuel Oil**	**83366**	**Yes**	**Yes**
50511	**Prenatal**	**Light Cycle Oil Developmental Toxicity Screen in Rats CAS No. 64741-59-9 HPV Category: Gas Oil**	**8281**	**Yes**	**Yes**
50541	**Prenatal**	**Clarified Slurry Oil Developmental Toxicity Study in Rats CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil**	**86001**	**Yes**	**Yes**
51841	Prenatal	Stock 141 Developmental Toxicity Screen in Rats CAS No. 64742-65-0 HPV Category: Lube Basestock	89040	Yes	No - No Method 2 data
61801	**Prenatal**	**Developmental Toxicity Screen in Rats Exposed Dermally to Heavy Vacuum Gas Oil (HVGO) CAS No. 64741-57-7 HPV Category: Heavy Fuel Oil**	**85244**	**Yes**	**Yes**
61998	**Prenatal Postnatal**	**Developmental Toxicity Screen in Rats Exposed Dermally to Coker Light Gas Oil (CLGO) CAS No. 64741-82-8 HPV Category: Gas Oil**	**87213**	**Yes**	**Yes**
62328	**Prenatal Postnatal**	**Developmental Toxicity Study in Rats Exposed Dermally to Vacuum Tower Overheads (VTO) CAS No. 64741-49-7 HPV Category: Gas Oil**	**86270**	**Yes**	**Yes**
62492	Prenatal	Teratology Study in Rats Exposed Dermally to Clarified Slurry Oil CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil	86001	Yes	No - Dosed GD 9-12 only
62494	Prenatal Postnatal	Developmental Toxicity Study in Rats Exposed Dermally to ********** CAS No. 64742-10-5 HPV Category: Aromatic Extract	87476	Yes	No - No Method 2 data
62884	**Prenatal Postnatal**	**Developmental Toxicity Study in Rats Exposed Dermally to ****** Furfural Extracts CAS No. 64742-04-7 HPV Category: Aromatic Extract**	**86187**	**Yes**	**Yes (prenatal only)**
62934	**Prenatal**	**Developmental Toxicity Study in Rats Exposed Dermally to ****** Syntower Bottoms CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil**	**86484**	**Yes**	**Yes**
63122	Prenatal	Developmental Toxicity in Rats Exposed Orally To A Single Dose of Clarified Slurry Oil CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil	86001	No- Oral Study	No- Oral Study
63123	Prenatal	Developmental Toxicity Study in Rats Exposed Orally to a Single Dose of ****** Syntower Bottoms (STB) CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil	86484	No- Oral Study	No- Oral Study
63239	Prenatal	Developmental Toxicity Study in Rats Exposed Dermally to API Separator Bottom Sludge CAS No. None given HPV Category: Waste	88614	Yes	No – Outside HPV PAC Categories[a]

Table 3A-7 (cont.). Developmental and Reproductive Toxicity Studies Provided to the TG

Study No.	Prenatal/ Postnatal[a]	Report Title CAS No. HPV Category	Sample No.	Data Extracted	Used in Final Models
63264	**Prenatal**	**Developmental Toxicity Study in Rats Exposed Dermally to DAF Float Blend** **CAS No. 68477-27-0 HPV Category: Waste**	**89106**	**Yes**	**Yes[d]**
63836	**Prenatal Postnatal**	**Developmental Toxicity Study in Rats Exposed Dermally to ****** Light** **CAS No. 8002-05-9 HPV Category: Crude oil**	**89645**	**Yes**	**Yes**
63848	**Prenatal Postnatal**	**Developmental Toxicity Study in Rats Exposed Dermally to ****** Heavy** **CAS No. 8002-05-9 HPV Category: Crude Oil**	**89646**	**Yes**	**Yes**
64146	**Prenatal Postnatal**	**Developmental Toxicity Study in Rats Exposed Dermally to Heavy Atmospheric Gas Oil** **CAS No. 68915-97-9 HPV Category: Gas Oil**	**86271**	**Yes**	**Yes**
64168	**Prenatal**	**Developmental Toxicity Study in Rats Exposed Dermally to Heavy Coker Gas Oil (HCGO)** **CAS No. 64741-81-7 HPV Category: Heavy Fuel Oil**	**86181**	**Yes**	**Yes**
64171		Dermal Administration of API Separator Bottom Sludge to Nulliparous (non-pregnant) Female Rats: Exploratory Study CAS No. None given HPV Category: Waste	88614	No – not a dev. tox study	No – Outside HPV PAC Categories[a]
64282	**Postnatal**	**Postnatal Developmental and Survival Study in Offspring of Rats Exposed Dermally to ****** Light** **CAS No. 8002-05-9 HPV Category: Crude oil**	**89645**	**Yes**	**Yes**
64283	**Postnatal**	**Postnatal Development and Survival Study in Offspring of Rats Exposed Dermally to ****** Heavy** **CAS No. 8002-05-9 HPV Category: Crude oil**	**89646**	**Yes**	**Yes**
64643	**Prenatal**	**Developmental Toxicity Study in Rats Exposed Dermally to V. B. Mittelol** **CAS No. 64741-81-7 HPV Category: Heavy Fuel Oil**	**86193**	**Yes**	**Yes**
65370	Prenatal	Teratogenicity Study in Rats Exposed Orally to a Single Dose of a Refinery Stream or Crude Oil CAS No. 64741-81-7 HPV Category: Heavy Fuel Oil	83366	No-Oral Study	No-Oral Study
65370		Teratogenicity Study in Rats Exposed Orally to a Single Dose of a Refinery Stream or Crude Oil CAS No. 8002-05-9 HPV Category: Crude Oil	89646	No-Oral Study	No-Oral Study
65370		Teratogenicity Study in Rats Exposed Orally to a Single Dose of a Refinery Stream or Crude Oil CAS No. 64741-81-7 HPV Category: Heavy Fuel Oil	86181	No-Oral Study	No-Oral Study
65370		Teratogenicity Study in Rats Exposed Orally to a Single Dose of a Refinery Stream or Crude Oil CAS No. 8002-05-9 HPV Category: Crude Oil	89645	No-Oral Study	No-Oral Study
65370		Teratogenicity Study in Rats Exposed Orally to a Single Dose of a Refinery Stream or Crude Oil CAS No. 68915-97-9 HPV Category: Gas Oil	86271	No-Oral Study	No-Oral Study
65371	Prenatal	Teratogenicity Study in Rats Exposed Orally to a Single Dose of a Refinery Stream CAS No. 64741-82-8 HPV Category: Gas Oil	87213	No-Oral Study	No-Oral Study
65371		Teratogenicity Study in Rats Exposed Orally to a Single Dose of a Refinery Stream CAS No. 64741-57-7 HPV Category: Heavy Fuel Oil	85244	No-Oral Study	No-Oral Study

Table 3A-7 (cont.). Developmental and Reproductive Toxicity Studies Provided to the TG

Study No.	Prenatal/ Postnatal[a]	Report Title CAS No. HPV Category	Sample No.	Data Extracted	Used in Final Models
65371		Teratogenicity Study in Rats Exposed Orally to a Single Dose of a Refinery Stream CAS No. 64741-55-5 HPV Category: Gasoline Blend	84152	No- Oral Study	No – Outside HPV PAC Categories[a]
65371		Teratogenicity Study in Rats Exposed Orally to a Single Dose of a Refinery Stream CAS No. 64741-49-7 HPV Category: Gas Oil	86270	No- Oral Study	No- Oral Study
65371		Teratogenicity Study in Rats Exposed Orally to a Single Dose of a Refinery Stream CAS No. 64741-59-9 HPV Category: Gas Oil	86195	No- Oral Study	No- Oral Study
ATX-890050	Prenatal	Developmental Toxicity Study In Rats Administered ****** Test Article F-115-01 Dermally CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil	F-115-01	Yes	No- No Method 2 data
ATX-910040		Screening Test for Reproductive Toxicity of F-179 Administered Percutaneously to Crl:CD®BR VAF/Plus® Male Rats CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil	F-179	No – not a dev. tox study	No – not a dev. tox study
ATX-910041		Screening Test for Reproductive Toxicity of F-179 Administered Percutaneously to Crl:CD®BR VAF/Plus® Female Rats CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil	F-179	No – not a dev. tox study	No – not a dev. tox study
ATX-910042	**Prenatal**	**Critical Period Developmental Toxicity (Embryo-Fetal Toxicity and Teratogenic Potential) Study of F-179 Administered Percutaneously to Crl:CD®BR VAF/Plus® Presumed Pregnant Rats CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil**	**F-179**	**Yes**	**Yes**
ATX-910127	**Postnatal**	**A Developmental Toxicity Screen in Female Sprague-Dawley Rats Administered F-193 Dermally During Gestation Days -7 to 20 CAS No. 64741-43-1 HPV Category: Gas Oil**	**F-193**	**Yes**	**Yes**
ATX-910128	**Postnatal**	**A Developmental Toxicity Screen in Female Rats Administered F-194 Dermally During Gestation Days 0 to 20 CAS No. 68410-00-4 HPV Category: Heavy Fuel Oil**	**F-194**	**Yes**	**Yes**
ATX-910129	**Postnatal**	**A Developmental Toxicity Screen in Female Sprague-Dawley Rats Administered F-195 Dermally During Gestation Days 0 to 20 CAS No. 68334-30-5 HPV Category: Gas Oil**	**F-195**	**Yes**	**Yes**
ATX-910130	**Postnatal**	**A Developmental Toxicity Screen in Female Sprague-Dawley Rats Administered F-196 Dermally During Gestation Days -7 to 20 CAS No. 64741-57-7 HPV Category: Heavy Fuel Oil**	**F-196**	**Yes**	**Yes**
ATX-910131	**Postnatal**	**A Developmental Toxicity Screen in Female Sprague-Dawley Rats Administered F-197 Dermally During Gestation Days -7 to 20 CAS No. 64741-57-7 HPV Category: Heavy Fuel Oil**	**F-197**	**Yes**	**Yes**
ATX-910133	**Postnatal**	**A Developmental Toxicity Screen in Female Rats Administered F-199 Dermally During Gestation Days -7 to 20 CAS No. 64741-82-8 HPV Category: Gas Oil**	**F-199**	**Yes**	**Yes**
ATX-910134	**Postnatal**	**A Developmental Toxicity Screen in Female Sprague-Dawley Rats Administered F-200 Dermally During Gestation Days -7 to 20 CAS No. 64741-81-7 HPV Category: Heavy Fuel Oil**	**F-200**	**Yes**	**Yes**

Table 3A-7 (cont.). Developmental and Reproductive Toxicity Studies Provided to the TG

Study No.	Prenatal/ Postnatal[a]	Report Title CAS No. HPV Category	Sample No.	Data Extracted	Used in Final Models
ATX-910135	Postnatal	A Developmental Toxicity Screen in Female Sprague-Dawley Rats Administered F-201 Dermally During Gestation Days -7 to 20 CAS No. 64741-57-7 HPV Category: Heavy Fuel Oil	F-201	Yes	Yes
ATX-910155	Postnatal	A Developmental Toxicity Screen in Female Sprague-Dawley Rats Administered F-179 Dermally During Gestation Days -7 to 20 CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil	F-179	Yes	Yes
ATX-910262	Postnatal	Developmental Toxicity Screen in Rats Administered Test Article F-213, ATX-91-0262 (Light Cycle Oil) CAS No. 64741-59-9 HPV Category: Gas Oil	F-213	Yes	Yes
ATX-910263	Postnatal	A Developmental Toxicity Screen in Female Rats Administered F-215 Dermally During Gestation Days 0 to 20 CAS No. 68410-00-4 HPV Category: Heavy Fuel Oil	F-215	Yes	Yes
ATX-910264	Postnatal	A Developmental Toxicity Screen in Female Rats Administered F-225 Dermally During Gestation Days 0 to 20 CAS No. 64741-57-7 HPV Category: Heavy Fuel Oil	F-225	Yes	Yes
ATX-910266	Postnatal	A Developmental Toxicity Screen in Female Rats Administered F-227 Dermally During Gestation Days 0 to 20 CAS No. 64742-86-5 HPV Category: Heavy Fuel Oil	F-227	Yes	Yes
ATX-910267	Postnatal	A Developmental Toxicity Screen in Female Rats Administered F-228 Dermally During Gestation Days 0 to 20 CAS No. 64741-45-3 HPV Category: Heavy Fuel Oil	F-228	Yes	Yes
ATX-910268	Postnatal	A Developmental Toxicity Screen in Female Rats Administered F-229 Dermally During Gestation Days 0 to 20 CAS No. 64741-62-4 HPV Category: Heavy Fuel Oil	F-229	Yes	Yes
ATX-910269	Postnatal	A Developmental Toxicity Screen in Female Rats Administered F-221 Dermally During Gestation Days 0 to 20 CAS No. None given HPV Category: Unidentified	F-221	Yes	Yes[c]
ATX-910270	Postnatal	A Developmental Toxicity Screen in Female Rats Administered F-222 Dermally During Gestation Days 0 to 20 CAS No. 64741-61-3 HPV Category: Heavy Fuel Oil	F-222	Yes	Yes
ATX-910290	Postnatal	A Developmental Toxicity Screen in Female Sprague-Dawley Rats Administered F-220 Dermally During Gestation Days 0 to 20 CAS No. 64741-76-0 HPV Category: Lube Basestock	F-220	Yes	Yes
ATX-920011	Prenatal	Dev. Toxicity (Embryo-Fetal Toxicity and Teratogenic Potential) Study of F-193 Administered Percutaneously to Crl:CD®BR VAF/Plus® Presumed Pregnant Rats CAS No. 64741-43-1 HPV Category: Gas Oil	F-193	Yes	Yes
ATX-920012	Prenatal	Dev. Toxicity (Embryo-Fetal Toxicity and Teratogenic Potential) Study of F-196 Administered Percutaneously to Crl:CD®BR VAF/Plus® Presumed Pregnant Rats CAS No. 64741-57-7 HPV Category: Heavy Fuel Oil	F-196	Yes	Yes
ATX-920013	Prenatal	Dev. Toxicity (Embryo-Fetal Toxicity and Teratogenic Potential) Study of F-199 Administered Percutaneously to Crl:CD®BR VAF/Plus® Presumed Pregnant Rats CAS No. 64741-82-8 HPV Category: Gas Oil	F-199	Yes	Yes

Table 3A-7 (cont.). Developmental and Reproductive Toxicity Studies Provided to the TG

Study No.	Prenatal/ Postnatal[a]	Report Title CAS No. HPV Category	Sample No.	Data Extracted	Used in Final Models
ATX-920154	**Prenatal**	**Dev. Toxicity (Embryo-Fetal Toxicity and Teratogenic Potential) Study of F-197 Administered Percutaneously to Crl:CD®BR VAF/Plus® Presumed Pregnant Rats CAS No. 64741-57-7 HPV Category: Heavy Fuel Oil**	**F-197**	**Yes**	**Yes**
ATX-920155	**Prenatal**	**Dev. Toxicity (Embryo-Fetal Toxicity and Teratogenic Potential) Study of F-215 Administered Percutaneously to Crl:CD®BR VAF/Plus® Presumed Pregnant Rats CAS No. 68410-00-4 HPV Category: Heavy Fuel Oil**	**F-215**	**Yes**	**Yes**
ATX-920156	**Prenatal**	**Dev. Toxicity (Embryo-Fetal Toxicity and Teratogenic Potential) Study of F-195 Administered Percutaneously to Crl:CD®BR VAF/Plus® Presumed Pregnant Rats CAS No. 68334-30-5 HPV Category: Gas Oil**	**F-195**	**Yes**	**Yes**
ATX-930021	**Postnatal**	**Developmental Toxicity Screen in Rats Administered Test Article F-233, TX-93-0021 (DHDS Stove Oil) CAS No. 64741-86-2 HPV Category: Gas Oil**	**F-233**	**Yes**	**Yes**
ATX-930023	Postnatal	A Developmental Toxicity Screen in Female Rats Administered F-236 Dermally During Gestation Days 0 to 20 CAS No. None given HPV Category: Unidentified	F-236	Yes	No – Outside HPV PAC Categories[a]
ATX-930024	Postnatal	A Developmental Toxicity Screen in Female Rats Administered F-250 Dermally During Gestation Days 0 to 20 CAS No. 68783-12-0 HPV Category: Gasoline Blend	F-250	Yes	No – Outside HPV PAC Categories[b]
ATX-930025	Postnatal	Developmental Toxicity Screen in Rats Administered Test Article F-251 (Merox Gasoline Stream) CAS No. 64741-41-9 HPV Category: Gasoline Blend	F-251	Yes	No – Outside HPV PAC Categories[b]
ATX-930069	**Postnatal**	**A Developmental Toxicity Screen in Female Rats Administered F-274 Dermally During Gestation Days 0 to 20 CAS No. 64741-81-7 HPV Category: Heavy Fuel Oil**	**F-274**	**Yes**	**Yes**
ATX-930071	**Postnatal**	**A Developmental Toxicity Screen in Female Rats Administered F-275 Dermally During Gestation Days 0 to 20 CAS No. 68783-08-4 HPV Category: Heavy Fuel Oil**	**F-275**	**Yes**	**Yes**
ATX-930073	**Postnatal**	**A Developmental Toxicity Screen in Female Rats Administered F-276 Dermally During Gestation Days -7 to 20 CAS No. 64741-57-7 HPV Category: Heavy Fuel Oil**	**F-276**	**Yes**	**Yes**
ATX-930075	**Postnatal**	**A Developmental Toxicity Screen in Female Rats Administered F-277 Dermally During Gestation Days -7 to 20 CAS No. 64741-82-8 HPV Category: Gas Oil**	**F-277**	**Yes**	**Yes**

[a] Prenatal studies - pregnant females exposed during gestation with a caesarean section on day 20 of gestation
Postnatal studies - pregnant females exposed during gestation, dams were allowed to deliver and pups monitored through day 4 of lactation.

[b] Boiling point of material below 300°F or sample information insufficient to assess BP >300°F

[c] Analytical report ATX-930020 shows BP 296-1027°F

[d] No BP data, but analytical report 63786 cites procedures used on materials boiling above 400°F

Table 3A-8. Developmental Study Dose Groups Excluded from Modeling

Study Type	Study No.	Sample No./CRU No.	Dose Levels	Duration of dosing	Reason Why Dose Group Excluded			
			(mg/kg)		Duration of Dosing	Low Group n	Proximal Control	Study Design
Prenatal	ATX-910042	F-179	1	GD 0-2	√			
	ATX-910042	F-179	50	GD 0-2	√			
	ATX-910042	F-179	250	GD 0-2	√			
	ATX-910042	F-179	1	GD 3-5	√			
	ATX-910042	F-179	50	GD 3-5	√			
	ATX-910042	F-179	250	GD 3-5	√			
	ATX-910042	F-179	1	GD 6-8	√			
	ATX-910042	F-179	50	GD 6-8	√			
	ATX-910042	F-179	250	GD 6-8	√			
	ATX-910042	F-179	1	GD 9-11	√			
	ATX-910042	F-179	50	GD 9-11	√			
	ATX-910042	F-179	250	GD 9-11	√			
	ATX-910042	F-179	1	GD 12-14	√			
	ATX-910042	F-179	50	GD 12-14	√			
	ATX-910042	F-179	250	GD 12-14	√			
	ATX-910042	F-179	1	GD 15-17	√			
	ATX-910042	F-179	50	GD 15-17	√			
	ATX-910042	F-179	250	GD 15-17	√			
	ATX-910042	F-179	1	GD 18-19	√			
	ATX-910042	F-179	50	GD 18-19	√			
	ATX-910042	F-179	250	GD 18-19	√			
Prenatal	ATX-920013	F-199	250	GD6-11	√			
Prenatal	50431	83366	0	GD 0-19			√	
Prenatal	50431	83366	125	GD 10-12	√			
Prenatal	50511	8281	0	GD 0-19			√	
	50511	8281	1000	GD 0-6	√			
	50511	8281	1000	GD 0-15	√			
Prenatal	50541	86001	0	GD 0-19			√	
	50541	86001	125	GD 0-19		√		
	50541	86001	250	GD 0-19		√		
	50541	86001	"4"	GD024681012 14 16 18	√			
	50541	86001	125	GD 0-19				√
Prenatal	61801	85244	0	GD 0-19			√	
Prenatal	61998	87213	0	GD 0-19			√	
	61998	87213	250	GD 0-15	√			
	61998	87213	500	GD 10-12	√			
Prenatal	62328	86270	0	GD 0-19			√	
	62328	86270	1000	GD 10-12	√			
Prenatal	62884	86187	500	GD 0-16	√			
	62884	86187	1000	GD 10-12	√			

Table 3A-8 (cont.). Developmental Study Dose Groups Excluded from Modeling

Study Type	Study No.	Sample No./CRU No.	Dose Levels	Duration of dosing	Reason Why Dose Group Excluded			
			(mg/kg)		Duration of Dosing	Low Group n	Proximal Control	Study Design
Prenatal	62934	86484	"4"	GD024681012 14 16 18	√			
	62934	86484	125	GD0-19		√		
	62934	86484	500	GD 10-12	√			
Prenatal	63264	89106	1000	GD 0-15	√			
Prenatal	64168	86181	250	GD 0-19		√		
Postnatal	62884	86187	0	GD 0-19		√		
	62884	86187	125	GD 0-19		√		
Postnatal	ATX-910155	F-179	250	PM7-GD20		√		
Postnatal	ATX-910127	F-193	1036	PM7-GD20		√		
Postnatal	ATX-910128	F-194	1000	GD5-9	√			
Postnatal	ATX-910129	F-195	1000	GD5-9	√			
Postnatal	ATX-910130	F-196	1000	PM7-GD20		√		
Postnatal	ATX-910131	F-197	965	PM7-GD20		√		
Postnatal	ATX-910133	F-199	250	PM7-GD8-11	√			
	ATX-910133	F-199	1000	PM7-M4	√			
Postnatal	ATX-910134	F-200	250	PM7-GD20		√		
Postnatal	ATX-910135	F-201	1000	PM7-GD20		√		
Postnatal	ATX-910262	F-213	1000	GD0-4,5 or 6	√			
Postnatal	ATX-910290	F-220	1000	GD5-9	√			
Postnatal	ATX-910269	F-221	1000	GD0-20		√		
Postnatal	ATX-910270	F-222	150	GD0-20		√		
	ATX-910270	F-222	500	GD0-20		√		
Postnatal	ATX-910266	F-227	1000	GD0-20		√		
Postnatal	ATX-930021	F-233	1000	GD0-5	√			
Postnatal	ATX-930069	F-274	250	GD0-20		√		

Table 3A-9. Compositional Studies Provided to the TG

Study No.	Report Title	Sample No.
20531	Chemical Characterization Studies of Light Cycle Oil (LCO)	8281
40691	Characterization of Gas Oil (CRU #84096) and Spent Gas Oil (CRU #84095): Condensed Phase and Static Headspace Analyses	84095
40692	Characterization of Gas Oil (CRU #84096) and Spent Gas Oil (CRU #84095): Condensed Phase and Static Headspace Analyses	84096
41161	Chemical Characterization Studies of Light Catalytically Cracked Naphtha (LCCN)	84152
41171	Chemical Characterization Studies of Heavy Coker Gas Oil (HCGO)	83366
50152	**Characterization and Quantitation of Polynuclear Aromatic Compounds in MLDW 100"PN**	**82191**
52264	Chemical Characterization Studies of Heavy Vacuum Gas Oil (HVGO)	85244
53201	**Characterization and Quantitation of Polynuclear Aromatics (PNA) in Light Cycle Oil**	**8281**
60711	**Chemical Characterization of Three Fractions Isolated From ****** Clarified Slurry Oil (CS)) (CRU No. 86001)**	**86001**
61525 ZA	**Chemical Characterization Studies of Heavy Coker Gas Oil (CRU No. 86181)**	**86181**
61525 ZC	**Chemical Characterization Studies of Heavy Coker Gas Oil (HCGO)**	**86272**
61527 ZE	Chemical Characterization Studies of Vacuum Tower Bottoms	86268
61528 ZA	**Chemical Characterization Studies of Visbreaker Gas Oil (VBGO)**	**86193**
61530 ZB	**Chemical Characterization Studies of Visbreaker Residue (VBR)**	**86192**
61696	Chemical Characterization Studies of Vacuum Tower Overhead	86270
61740 ZA	**Chemical Characterization Studies of 318 Isthmus ****** Furfural Extract**	**86187**
61741 ZD	**Chemical Characterization Studies of Heavy Atmospheric Gas Oil (HAGO)**	**86271**
61807	**Chemical Characterization Studies of Syntower Bottoms (STB)**	**86484**
61862 ZA	Analysis of 318 Fufural Extract for Sulfur and Nitrogen	86187
61988	Chemical Characterization of Light Coker Gas Oil (LCGO)	87213
62575	Determination of Benzo(A) Pyrene in I******sol 40******	87438
62775	**Chemical Characterization Studies of Coker Light Gas Oil**	**87213**
62776	**Chemical Characterization Studies of ****** BSS Furfural Extra (FE)**	**87293**
62777	**Chemical Characterization Studies of ****** Extrait BSS**	**87058**
62778	**Chemical Characterization Studies of ****** Heavy Vacuum Gas Oil (HVGO) (CRU No. 85244)**	**85244**
62779	**Chemical Characterization Studies of Heavy Coker Gas Oil (HCGO)**	**83366**
62780	**Chemical Characterization Studies of Light Cycle Oil (LCO)**	**8281**
62781	Chemical Characterization Studies of Light Catalytically Cracked Naphtha (LCCN)	86045
62783	**Chemical Characterization Studies of Bright Stock Extract (BSE)**	**86525**
63057	Characterization and Quantitation of Polynuclear Aromatics (PNA) in API Separator Bottom Sludge	88614
63263	**Characterization and Quantitation of Polynuclear Aromatics (PNA) in Blended DAF Float**	**89106**
63402	**Chemical Characterization Studies of Vacuum Tower Bottoms (VTB)-Stock 141 Mixture (50:50 v/v)**	**86268**
63786	**Chemical Characterization Studies of DAF Float Blend**	**89106**
63803 ZD	**Characterization and Quantitation of Polynuclear Aromatics (PNA) in Heavy Atmospheric Gas Oil**	**86271**
63806 ZF	**Characterization and Quantitation of Polynuclear Aromatics (PNA) in Vacuum Tower Overhead**	**86270**
63837	**Analytical Characterization of Light Crude Oil**	**89645**
63849	**Analytical Characterization of Heavy Crude Oil**	**89646**
63898 ZA	Chemical Characterization Studies of Vacuum Tower Bottoms	86268
63898 ZB	**Chemical Characterization Studies of Stock 141**	**89040**
63898 ZC	**Chemical Characterization Studies of Vacuum Tower Bottoms - Stock 141 Mixture (50:50 w/w)**	**90062**
64180	**Chemical Characterization Studies of Heavy ********	**89646**
64348ZA	**Characterization and Quantitation of Polynuclear Aromatics (PNA) in Clarified Slurry Oil**	**86001**
64348 ZO	**Characterization and Quantitation of Polynuclear Aromatics (PNA) in Heavy Coker Gas Oil (HCGO**	**86181**
64348 ZV	**Characterization and Quantitation of Polynuclear Aromatics (PNA) in Heavy Vacuum Gas Oil (CRU #85244)**	**85244**

Table 3A-9 (cont.). Compositional Studies Provided to the TG

Study No.	Report Title	Sample No.
64348 ZM	**Characterization and Quantitation of Polynuclear Aromatics (PNA) in Syn Tower Bottoms (STB)**	**86484**
64348 ZN	**Characterization and Quantitation of Polynuclear Aromatics (PNA) in Coker Light Gas Oil**	**87213**
64348 ZQ	**Characterization and Quantitation of Polynuclear Aromatics (PNA) in Coker Heavy Gas Oil (HGO)**	**83366**
64348 ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA) in Heavy Coker Gas Oil**	**86272**
64348 ZT	**Characterization and Quantitation of Polynuclear Aromatics (PNA) in V. B. Mittelol**	**86193**
64349 ZA	**Characterization and Quantitation of Polynuclear Aromatics (PNA) in 318 Isthmus ****** Furfural Extract**	**86187**
64349 ZF	Characterization and Quantitation of Polynuclear Aromatics (PNA) in Lt Cycle Oil	8181
64349 ZW	Characterization and Quantitation of Polynuclear Aromatics (PNA) in Light Catalytically Cracked Naphtha (LCCN)	86045
64925ZA	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-179
64925ZB	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-193
64925ZC	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-194
64925ZD	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-195
64925ZE	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-196
64925ZF	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-197
64925ZG	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-198
64925ZH	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-199
64925ZI	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-200
64925ZJ	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-201
64925ZK	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-211
64925ZL	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-213
64925ZM	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-214
64925ZN	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-215
64925ZO	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-216
64925ZP	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-218
64925ZQ	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-220
64925ZR	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-221
64925ZS	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-222
64925ZT	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-223
64925ZU	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-224
64925ZV	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-225
64925ZW	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-227
64925ZX	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-228
64925ZY	Isolation and Characterization of Pyrrole Benzologues in ****** Refinery Streams	F-229
65064 ZA	Characterization and Quantitation of Polynuclear Aromatics (PNA) in Stock 142	91940
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-229**
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-228**
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-227**
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-225**
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-222**
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-221**
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-220**
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-179**
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-193**
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-194**
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-195**
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-196**
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-197**
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-199**
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-200**
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-201**
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-213**

Table 3A-9 (cont.). Compositional Studies Provided to the TG

Study No.	Report Title	Sample No.
65726ZA-ZR	**Characterization and Quantitation of Polynuclear Aromatics (PNA)**	**F-215**
66149	**Characterization and Quantitation of Mononuclear and Polynuclear Aromatics (PNA), Sulfur-PNA. Total and Basic Nitrogen in Various Refinery Streams**	**F-274**
66149	**Characterization and Quantitation of Mononuclear and Polynuclear Aromatics (PNA), Sulfur-PNA. Total and Basic Nitrogen in Various Refinery Streams**	**F-275**
66149	**Characterization and Quantitation of Mononuclear and Polynuclear Aromatics (PNA), Sulfur-PNA. Total and Basic Nitrogen in Various Refinery Streams**	**F-277**
66149	**Characterization and Quantitation of Mononuclear and Polynuclear Aromatics (PNA), Sulfur-PNA. Total and Basic Nitrogen in Various Refinery Streams**	**F-276**
66149	Characterization and Quantitation of Mononuclear and Polynuclear Aromatics (PNA), Sulfur-PNA. Total and Basic Nitrogen in Various Refinery Streams	F-250
66149	**Characterization and Quantitation of Mononuclear and Polynuclear Aromatics (PNA), Sulfur-PNA. Total and Basic Nitrogen in Various Refinery Streams**	**F-233**
66149	Characterization and Quantitation of Mononuclear and Polynuclear Aromatics (PNA), Sulfur-PNA. Total and Basic Nitrogen in Various Refinery Streams	F-236
66149	Characterization and Quantitation of Mononuclear and Polynuclear Aromatics (PNA), Sulfur-PNA. Total and Basic Nitrogen in Various Refinery Streams	F-251
ATX-900001	Certificate of Analysis - Certificate # 10001199	F-73-01
ATX-900001	Certificate of Analysis - Certificate # 10001199	F-115-01
ATX-900002	Certificate of Analysis - Certificate # 10001200	F-73-01
ATX-900002	Certificate of Analysis - Certificate # 10001200	F-115-01
ATX-920099	Certificate of Analysis - Certificate # 21012009	F-127
ATX-920100	Certificate of Analysis - Certificate # 21012010	F-128
ATX-920101	Certificate of Analysis - Certificate # 21012011	F-129
ATX-920102	Certificate of Analysis - Certificate # 21012012	F-130
ATX-920103	Certificate of Analysis - Certificate # 21012013	F-131
ATX-920104	Certificate of Analysis - Certificate # 21012014	F-132
ATX-920106	Certificate of Analysis - Certificate # 21012016	F-134
ATX-920121	Certificate of Analysis - Certificate # 21207005	F-179
ATX-920126	Certificate of Analysis - Certificate # 21207010	F-184
ATX-920127	Certificate of Analysis - Certificate # 21207011	F-185
ATX-920128	Certificate of Analysis - Certificate # 21207012	F-186
ATX-920129	Certificate of Analysis - Certificate # 21207013	F-188
ATX-920134	Certificate of Analysis - Certificate # 21207018	F-193
ATX-920135	Certificate of Analysis - Certificate # 21207019	F-194
ATX-920136	Certificate of Analysis - Certificate # 21207020	F-195
ATX-920137	Certificate of Analysis - Certificate # 21207021	F-187
ATX-930004	Certificate of Analysis - Certificate # 30330004	F-196
ATX-930005	Certificate of Analysis - Certificate # 30330005	F-197
ATX-930006	Certificate of Analysis - Certificate # 30330006	F-198
ATX-930007	Certificate of Analysis - Certificate # 30330007	F-199
ATX-930008	Certificate of Analysis - Certificate # 30330008	F-200
ATX-930009	Certificate of Analysis - Certificate # 30330009	F-201
ATX-930010	Certificate of Analysis - Certificate # 30330010	F-202
ATX-930014	Certificate of Analysis - Certificate # 30402015	F-213
ATX-930016	Certificate of Analysis - Certificate # 30402017	F-215
ATX-930019	Certificate of Analysis - Certificate # 30402018	F-220
ATX-930020	Certificate of Analysis - Certificate # 30330014	F-221
ATX-930026	Certificate of Analysis - Certificate # 30402020	F-222
ATX-930154	Certificate of Analysis - Certificate # 10002153	F-246
ATX-930155	Certificate of Analysis - Certificate # 10002154	F-247
ATX-930156	Certificate of Analysis - Certificate # 10002155	F-248
ATX-930157	Certificate of Analysis - Certificate # 10002156	F-249
ATX-930158	Certificate of Analysis - Certificate # 10002157	F-250
ATX-930159	Certificate of Analysis - Certificate # 10002158	F-251

Table 3A-9 (cont.). Compositional Studies Provided to the TG

Study No.	Report Title	Sample No.
ATX-930160	Certificate of Analysis - Certificate # 10002159	F-267
ATX-930161	Certificate of Analysis - Certificate # 10002160	F-268
ATX-930180	Analyses of ******* Petroleum Streams Samples Set II	F-225
ATX-930181	Analyses of ******* Petroleum Streams Samples Set II	F-227
ATX-930182	Analyses of ******* Petroleum Streams Samples Set II	F-228
ATX-930183	Analyses of ******* Petroleum Streams Samples Set II	F-229
ATX-930184	Analyses of ******* Petroleum Streams Samples Set II	F-252
ATX-930185	Analyses of ******* Petroleum Streams Samples Set II	F-253
ATX-930186	Analyses of ******* Petroleum Streams Samples Set II	F-254
ATX-930187	Analyses of ******* Petroleum Streams Samples Set II	F-255
ATX-930188	Analyses of ******* Petroleum Streams Samples Set II	F-266